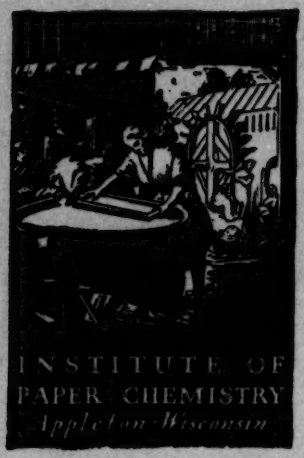
PAGES 843-934

BULLETIN

OF

THE INSTITUTE OF PAPER CHEMISTRY



AFFILIATED WITH

LAWRENCE COLLEGE

APPLETON, WISCONSIN

LIBRARY NOTES

AUGUST · 1950

Volume 20 Number 12

THE cut on the cover is a reproduction of the Bookplate of The Institute of Paper Chemistry. The drawing, entitled, "the Papermaker," first appeared in 1698 in the Book of Trade by Christoff Weigel. This particular reproduction has been copied from an illustration appearing on page 43 of Dard Hunter's book "Papermaking Through Eighteen Centuries," published in New York in 1930 by William Edwin Rudge. THE INSTITUTE is greatly indebted to Mr. Hunter for permission to use the illustration.

BULLETIN

of

THE INSTITUTE of PAPER CHEMISTRY

AFFILIATED WITH

LAWRENCE COLLEGE

APPLETON, WISCONSIN

AUGUST · 1950

Volume 20 Number 12

LIBRARY NOTES

The Bulletin of The Institute of Paper Chemistry is published monthly at Appleton, Wisconsin, by the Board of Trustees of The Institute of Paper Chemistry. Entered as Second Class matter November 13, 1930, at the postoffice at Appleton, Wis., under the act of August 24, 1912.

THE INSTITUTE OF PAPER CHEMISTRY

OFFICERS

ERNST MAHLER	Chairman of the Board
D. C. EVEREST	Vice-Chairman of the Board
JOHN L. RIEGEL	Vice-Chairman of the Board
WESTBROOK STEELE	President
JOHN G. STRANGE	Vice-President—Treasurer
C. B. SITTERSON, JR.	Secretary
DORIS PICKERT	Assistant Secretary

BOARD OF TRUSTEES

NATHAN M. PUSEY, President of Lawrence College, ex officio
WESTBROOK STEELE, President of The Institute of Paper Chemistry, ex officio

For the term expiring in 1950

DAN K. BROWN, Neenah Paper Company, Neenah, Wis.
GEORGE E. DYKE, Robert Gair Company, New York, N.Y.
STUART E. KAY, International Paper Company, New York, N.Y.
A. B. LAYTON, Crown Zellerbach Corporation, San Francisco, Calif.

For the term expiring in 1951

ALEXANDER CALDER, Union Bag & Paper Corporation, New York, N.Y.
SYDNEY FERGUSON, The Mead Corporation, Dayton, Ohio.
ERNST MAHLER, Kimberly-Clark Corporation, Neenah, Wis.
W. IRVING OSBORNE, JR., Cornell Wood Products Company, Chicago, Ill.
KARL E. STANSBURY, Thilmany Pulp and Paper Company, Kaukauna, Wis.

For the term expiring in 1952

D. C. EVEREST, Marathon Corporation, Rothschild, Wis.
DAVID L. LUKE, JR., West Virginia Pulp and Paper Company, New York, N.Y.
HERBERT T. RANDALL, The Champion Paper and Fibre Company, Hamilton, Ohio.
JOHN L. RIEGEL, Riegel Paper Corporation, New York, N.Y.
GEORGE OLMSTEAD, JR., S. D. Warren Company, Boston, Mass.

STANDING COMMITTEES OF THE TRUSTEES

EXECUTIVE COMMITTEE: Ernst Mahler, Chairman; D. K. Brown, George E. Dyke, David L. Luke, Jr., and Karl E. Stansbury.
INVESTMENT COMMITTEE: Ernst Mahler, Chairman; D. K. Brown, John G. Strange, and Ralph J. Watts.
COMMITTEE ON ACADEMIC POLICY: Nathan M. Pusey, Chairman; Rex Hovey, Harry F. Lewis, Ernst Mahler, John L. Riegel, Westbrook Steele, and John G. Strange.

Books and Pamphlets Added to the Library During July

ADHESIVES

AMERICAN SOCIETY FOR TESTING MATERIALS. *Committee D-14 on Adhesives.* A.S.T.M. standards on adhesives, Philadelphia, The Society, 1950. p. 787-845.

CATALOGING

RULES for descriptive cataloging in the Library of Congress (adopted by the American Library Association). Washington, The Library of Congress. Descriptive Cataloging Division, 1949. 141 p.

CHEMISTRY, INORGANIC—SYNTHESIS

INORGANIC SYNTHESES. Editor-in-chief, Ludwig F. Audrieth, New York, McGraw-Hill Book Co., 1950. v. 3. 230 p.

COLLOIDS

MCBAIN, JAMES W. Colloid science. Boston, D. C. Heath and Co.; trade edition distributors Reinhold Publ. Co. [c1950] 450 p.

DETERGENTS

NIVEN, WILLIAM W., JR. Fundamentals of detergency. Under the sponsorship of the American Institute of Laundering, national trade association of the laundry industry. [New York] Reinhold, 1950. 256 p.

DIELECTRICS

FRÖHLICH, H. Theory of dielectrics; dielectric constant and dielectric loss. Oxford, Clarendon Press, 1949. 180 p.

EDUCATION, HIGHER

U. S. OFFICE OF EDUCATION. Education directory, 1949-50. Part 4. Education associations. [Prepared by Florence E. Reynolds. Washington, U. S. Govt. Print. Off., 1950] 59 p.

ELECTRIC INSULATORS AND INSULATION

AMERICAN SOCIETY FOR TESTING MATERIALS. *Committee D-9 on Electrical Insulating Materials.* A.S.T.M. standards on electrical insulating materials (with related information). Specifications, methods of testing. Philadelphia, The Society, 1950. 660 p.

FOAM

ROSS, SYDNEY. The inhibition of foaming; the theory of foam inhibition by insoluble antifoaming agents and a review of current industrial problems and practices. [Rensselaer Polytechnic Institute bulletin. Engineering and science series. Number 63] Troy, N.Y., The Institute, 1950. 40 p.

GERMAN LANGUAGE

PATTERSON, AUSTIN M. A German-English dictionary for chemists. 3d ed. New York, Wiley [c1950]

GRANTS-IN-AID

THE COUNCIL OF STATE GOVERNMENTS. *Committee on Federal Grants-in-Aid.* Federal grants-in-aid; report of the Committee on Federal Grants-in-Aid. [Chicago] The Council [c1949] 322 p.

PAINT

VON FISCHER, WILLIAM, ed. Paint and varnish technology. New York, Reinhold, 1948. 509 p.

PAPER MAKING AND TRADE

The PULP and paper manual of Canada; a publication that keeps pace with current developments in equipment, describes ideas for maintaining of plant machinery and provides a catalog of the equipment and supplies available to the pulp and paper industry with an extensive classified index of equipment and supplies. 18th ed. Gardenvale, Que., National Business Publications Ltd., 1950. 435 p.

PAPER SPECIALTIES

[U. S. NATIONAL BUREAU OF STANDARDS] Loaded paper shot shells. Simplified practice recommendation 31-50. Washington, U. S. Govt. Print. Off., 1950. 12 p.

PLASTIC MATERIALS

AMERICAN SOCIETY FOR TESTING MATERIALS. *Committee D-20 on Plastics.* A.S.T.M. standards on plastics. Specifications, methods of testing, nomenclature, definitions. Philadelphia, The Society, 1950. 1078 p.

SORRELL, S. E. Paper base laminates. London, Cleaver-Hume Press Ltd. [1950] 223 p.

RADIOACTIVITY

CURTISS, LEON F. Measurements of radioactivity. U. S. National Bureau of Standards circular 476. Washington, U. S. Govt. Print. Off., 1949. 84 p.

STATISTICS

IMMER, FORREST R. Applied statistics, a series of lectures given in the Graduate School of the University of Minnesota. Minneapolis, Burgess Publ. Co., 1950. 157 p.

STREAM POLLUTION

BARNES, GEORGE B., MOGGIO, WILLIAM A., and COLMER, ARTHUR A. Bacteriological studies of stored kraft paper mill wastes; report of investigation conducted by the Engineering Experiment Station and the Department of Botany, Bacteriology and Plant Pathology, Louisiana State University. Engineering Experiment Station bulletin series no. 19. Baton Rouge, La., The University, 1950. 46 p.

TRADE DIRECTORIES

WALDEN'S ABC guide edition for 1950. The annual paper directory for manufacturer, merchant, converter. [New York, Walden, Sons & Mott, Inc.] 1950. 480 p.

U. S. BUREAU OF THE CENSUS—PUBLICATIONS

DUBESTER, HENRY J. Catalog of United States Census publications, 1790-1945. Washington, U. S. Govt. Off., 1950. 320 p.

WOOD WASTE

NORTHEASTERN WOOD UTILIZATION COUNCIL. Wood products for fertilizer. Bulletin no. 32. New Haven, The Council, 1950. 53 p.

Survey of Periodical Articles

The following are abstracts of opinions expressed by writers in the technical journals. The Institute of Paper Chemistry takes no responsibility for the opinions here summarized.

ADHESIVES

TRIANGLE PACKAGE MACHINERY COMPANY, *Chicago.* Continuous viscosity mixed for flake adhesives. Fibre Containers 35, no. 7: 77-8 (July, 1950).

A brief illustrated description is given of the Visco-Mat automatic adhesive mixing machine to be used with the flake-type adhesive manufactured by National Starch Products, Inc., or other cold water-soluble adhesives. Its use is said to be feasible where about 500 pounds of adhesive are used per day. 1 illustration. E.S.

WEINERMAN, BURT, and SMITH, VINCENT. Liquid vs. dry adhesives. Am. Paper Converter 24, no. 7: 8-9, 32, 34 (July, 1950).

A brief review is given of the factors to be considered by the envelope manufacturer in choosing between liquid and dry adhesives. The use of liquid adhesives eliminates the need for expensive cooking equipment, large-scale storage facilities, and labor for the preparation of the adhesives but, on the other hand, dry adhesives are easier to handle and cheaper to ship and store. In general, the liquid form is favored by small manufacturers, whereas large-quantity consumption makes dry adhesives preferable. 7 illustrations. J.A.B.

AIR CONDITIONING

ROBINSON, KARL DAVIS. Air conditioning. Parts 2-8. Modern Lithography 17, no. 11: 55, 88 (November, 1949); 18, no. 1: 33-4, 87, 89; no. 2: 47, 49; no. 4: 55, 57, 95; no. 5: 59, 61, 103, 105; no. 6: 57, 59, 105; no. 7: 43-5, 97 (January, February, April-July, 1950); *cf.* B.I.P.C. 20: 69.

Excerpts are given from the book "What the lithographer should know about air conditioning," published by the Lithographic Technical Foundation; the following items are discussed in turn: the properties and behavior of air, available air-conditioning methods and equipment, methods of dehumidification with different chemical agents, and a hypothetical survey of a typical lithographic plant in the New York area which would be made prior to the selection of the equipment. 1 diagram and 1 illustration. E.S.

ALKALINE PROCESSES

CLAPPERTON, WILLIAM. On wood as a material for making paper. Paper-Maker (London) 119, no. 6: 407-8 (June, 1950).

The highlights of a paper are reproduced which was read before the Institute of Engineers of Scotland and published in the *English Mechanic and World of Science* in August, 1871. The Sinclair process for cooking wood with caustic soda and its economic advantages are outlined; a brief discussion is included. E.S.

SLOMAN, A. R. Two-stage countercurrent pulping. Australian Pulp & Paper Ind., Tech. Assoc., Proc. 3: 47-68; discussion: 68-71 (December, 1949).

Experiments and mill operation are described relating to a two-stage countercurrent pulping system for the soda process. The system involves the treatment of new wood in a first stage with black liquor from the second stage of previous cooks. In the first stage over 85% of the caustic alkali is neutralized. The maximum temperature and time of treatment at that temperature are of the order of 170° C. and a quarter of an hour. Liquor is withdrawn after the first stage and sent to the soda recovery system. The second stage is similar to a normal alkaline cook but the soda added is reduced by an amount equal to that neutralized in the first stage. To obtain pulp of a given permanganate number, the time at maximum temperature in the second stage is the same as that required in a single-stage cook using a soda charge equal to the sum of the soda neutralized in the first stage and soda added in the second stage. In mill operations this system reduces the soda requirement by about 30% and requires 50% more steam and possibly more digester capacity per ton of pulp. 8 tables, 5 figures, and 6 references.

E.S.

ALKALINE PROCESSES—ODOR TROUBLE

REID, H. A. The odour problem at Maryvale. Australian Pulp & Paper Ind., Tech. Assoc., Proc. 3: 479-96; discussion: 496-500 (December, 1949).

The author describes the sulfate process as conducted at the Maryvale mill of Australian Paper Manufacturers Ltd., which uses principally *Eucalyptus regnans* and *Eucalyptus obliqua* as pulpwood. The operations are associated with serious odor problems, and the fact is mentioned that there is a remarkable difference in the amount and odor of gases produced from softwoods and hardwoods. Most of the condensable odorous sulfur compounds from eucalypt cooks consist of diisopropyl disulfide, which is particularly foul-smelling, and the odor has on occasions extended more than 20 miles from the mill. The sources and extent of the various odors are described, the various gaseous and liquid effluents are examined individually, and their relative seriousness is noted. The possibility of reducing the sources of odors is discussed, treating each one separately. Two recently devised methods of controlling the blow are described so that digester gases can be constrained and treated, and methods of treatment are considered. The effect of air oxidation of black liquor in improving the odor of the evaporator foul gas and of the recovery stack gas is described; further improvement is expected when a larger treatment plant is installed. Alternative means of treating liquid effluents, or of decreasing the volumes to be treated, are described. The possibility of retaining some of the effluent within the system (for washing green dregs, thereby converting the foul water to weak liquor) is noted. The importance of the recovery furnace stack gas with regard to odor is stressed, and the peculiar differences between two types of recovery furnaces and their odorous combustion products are described. The most significant difference between the two furnaces is the lack of air heating and of secondary air in the unit which gives off the more offensive odors; tests to determine the cause are in progress. The significance of the sulfur losses with these various odorous effluents, particularly in the case of the stack gases, in determining the equilibrium sulfidity of the mill is shown by sulfur-loss and soda-loss charts. The following improvements are planned or under construction: a full-scale air-oxidation tower, replacement of the recovery furnace without air system, closing of the digester foul-gas system, burning

of the gases leaving the air-oxidation tower, and use of as much as possible of the foul condensates in the causticizing department. These improvements are expected to decrease the odor problem of the mill considerably in the future. 1 table and 4 figures. E.S.

ALKALINE PROCESSES—RECOVERY

REID, H. A. Soda recovery and losses in kraft pulping. Australian Pulp & Paper Ind., Tech. Assoc., Proc. 3: 338-57; discussion: 357-60 (December, 1950).

The author surveys the recorded estimates of soda losses in the kraft pulping process. It is shown that most of the losses occur in the soda recovery section, particularly from the furnace. The equipment which is used to recover fume and heat from the furnace gases is described in some detail. Soda losses at Maryvale are tabulated and compared with oversea figures. The analyses of the recovery material are also compared. Reference is made to the effect of recovery methods and efficiency, and to furnace operation, on resulting sulfidity. Methods of detecting and recording soda losses, and the possibility of decreasing such losses at Maryvale in particular, are listed. In conclusion, the fact is mentioned that losses may not always be real. 4 tables, 5 figures, and 36 references. E.S.

ASSOCIATIONS

MACINTYRE, EVERETTE. Robinson-Patman Act and our antimonopoly policy. Fibre Containers 35, no. 7: 47-52 (July, 1950).

Following a brief history of antimonopoly legislation in the United States, the work of the Federal Trade Commission with respect to trade associations, particularly trade-restraining activities, is discussed. E.S.

BAMBOO

AGGARWALA, JAGDISH C. Characteristics of bamboo celluloses. Indian Pulp and Paper 4, no. 10: 393-7 (April, 1950).

The author outlines the work done in the field, with special reference to his own investigations. Although native cellulose in bamboo is associated with relatively large amounts of hemicellulose and silica, there is ample evidence to show that bamboo cellulose is structurally similar to cotton cellulose. Results are given of studies on the molecular weight distribution of celluloses in bamboo. It was found that the celluloses of hemlock and sprucewoods have almost entirely either quite high or quite low D.P.'s, whereas nearly 65% of the native cellulose of bamboo is of intermediate D.P., ranging between 500 and 2000. 2 tables, 2 figures, and 15 references. J.A.B.

BARK

FULLER, R. GLEN, HARSTON, C. B., and CHESTER, K. STARR. The utilization of waste bark. Northeastern Wood Utilization Council, Bull. no. 32: 27-32 (June, 1950).

The use of ground bark as a poultry litter, a mulch and soil conditioner, and a rooting medium for cuttings was investigated. The ground bark was found entirely satisfactory for the majority of co-operating poultrymen; it is inexpensive at a reasonable distance from its source. Tests with bark used as a mulch indicated the bark to be superior to other more expensive mulches on sandy, heavy-clay, and composted soils. When bark or other cellulosic material is incorporated into soil, there is a temporary tie-up of available

nitrogen. Experiments are under way for fortifying the bark with available nitrogen to overcome this defect. Trials with ground bark as a medium for rooting cuttings proved disappointing. 3 diagrams. E.S.

BARKERS AND BARKING

ANON. Hansel ring barker; effective water seal is feature. Pulp & Paper 24, no. 8: 58, 60 (July, 1950).

An illustrated description of the Hansel ring-type hydraulic barker is given; the first unit was installed at the Port Alberni, B.C. kraft pulp mill, and the second in the new Weyerhaeuser board mill at Springfield, Ore. Two further units are on order for the new Potlatch, Idaho mill of Weyerhaeuser. Special reference is made to the effective seal between the rotating rotor and the stator, which consists of a stationary ring rotating on a film of lubricating water on a micarta ring on the rotor. 3 illustrations and 1 diagram. E.S.

BEATER ADDITIVES

BROWN, A. D. High polymeric addition agents—their relation to the physical properties of pulp and paper. Australian Pulp & Paper Ind., Tech. Assoc., Proc. 3: 121-40; discussion: 140-3 (December, 1949).

The results of the application of a number of water-soluble and emulsified polymers (melamine- and urea-formaldehyde resins, methyl- and carboxymethylcelluloses, guaran, and several elastomers and resins of a more brittle nature) to paper and pulp stock are presented. The purpose of the study was the possible improvement of the strength properties of papers prepared from eucalyptus pulps; it was not concerned with printability. The mechanisms of some aspects of the effects produced are discussed, and reasons given for the failure of emulsified addition agents to improve paper strengths when used in quantities below a certain (varying) value. Materials capable of forming strong bonds with cellulosic fibers are shown to raise tensile and bursting strengths and folding endurance, but the effect on tearing strength is more complex and dependent on the type and condition of the pulp. 5 tables, 4 figures, and 8 references. E.S.

BEATING

IMSET, OTTO. Beating problems in stock preparation. Norsk Skogind. 4, no. 5: 143-6 (May, 1950). [In Norwegian; English summary] *cf.* B.I.P.C. 19: 106-7.

During recent years many new types of beating equipment have been placed on the market; methods are needed for evaluating the kind of work they perform to guide the papermaker in the selection of equipment most suitable for developing the special use requirements of his products. In laboratory processing, which the author terms the analytical beating technique (I), the principal purpose is to achieve a beating treatment with as little shortening of the fibers as possible; as a result, the important dehydration properties (II) vary very little. In mill-scale beating, which the author calls the technical beating treatment (III), on the other hand, a technique is required which offers the greatest possibilities for varying (II). With the aid of several curves, the author discusses the relationship between beating time, degrees S.-R., development of strength properties in general or one particular strength property, and power consumption. In one diagram the problems are distributed over three fields: the steepest curves encompass the range of the most rapid development of (II), the medium field represents the

achievement of the maximum possible (II) and strength properties compatible with the lowest possible power consumption, and the lowest field shows a gradual development of (II) with highest demands on strength properties. By following the limitations of these ranges, the papermaker has three different possibilities available for varying (II) on a mill scale; however, it is evident that a typical (I) does not express these possibilities correctly. The author explains how (I) must be adjusted to give an indication of these special technical demands by performing several beating tests, each conducted differently from the others. The suitability of the P.F.I. differential mill (*cf.* B.I.P.C. 19: 107-8) for this purpose is stressed. 4 diagrams. E.S.

TOLVI, ERKKI. The beating of kraft pulp. Paper and Timber (Finland) 32, no. 5: 136-9 (May, 1950). [In Finnish; English summary]

The pH value of a kraft pulp delivered to the paper mill from an integrated sulfate mill varies between 7.5 and 9, whereas the pH value of the beaten pulp going to the paper machine amounts to about 5 to 6.5 after the addition of alum and size. Thus, beating can be carried out over a wide range of acidity. To find the most suitable pH conditions for beating, particularly with regard to power consumption and strength properties of the resulting paper, laboratory tests were carried out in a Valley beater and mill-scale tests in a jordan. It was found that a change in surface tension of the pulp-suspension water through the addition of chemicals has an effect on the swelling of the pulp fibers and, hence, on the beating rate of the pulp. The following conclusions can be drawn from laboratory and mill tests performed under different conditions of acidity. The rate of beating increases with increasing alkalinity, so that beating under alkaline conditions accomplishes a considerable saving in power. The strength properties of paper are slightly better under alkaline than under acid beating conditions; the maximum is obtained at a pH of approximately 8. The strength properties are adversely affected by either a high alkalinity or a high acidity. 4 tables, 16 diagrams, and 4 references. E.S.

WILLIAMSON, HARRY. Paper and paperboard making. IV. Questions on beating answered. Paper Ind. 32, no. 3: 283-8 (June, 1950); *cf.* B.I.P.C. 20: 818.

Seventeen questions on beating problems and their answers are presented. E.S.

BLEACHING—GROUNDWOOD

BRECHT, WALTER, JAYME, GEORG, and SCHUSTER, GÜNTHER. Groundwood bleaching with peroxide as compared with the customary procedures used hitherto. Das Papier 4, no. 11: 174-89 (June, 1950). [In German]

A brief historical review of sodium peroxide (I) bleaching is given, together with schematic diagrams showing continuous and discontinuous bleaching operations; sodium bisulfite (II) and sodium hydrosulfite (III) bleaching techniques are also described and discussed. Spruce groundwood (IV) was bleached with a solution containing 20 grams of (I), 50 grams of sodium silicate, and 17 grams of sulfuric acid per liter, followed by treatment with 1% (II) based on dry (IV). Bleaching at 15% stock density with 2% (I) at varying temperatures showed that optimum brightness was obtained at 40° C., thus involving no external application of heat. The optimum stock density (at 40°) with 2% (I) was about 8%. Brightness was in-

fluenced markedly by bleaching time, and percentage of (I) based on dry (IV). The optimum increase in brightness (from an initial 55.8% up to 71.3%) was attained in five hours with 5% (I); longer bleaching periods acted adversely. Whereas with 2% (I), bleach consumption was at least 95% complete within 2.5 hours, this percentage consumption in the case of 5% (I) was reached only after about 23 hours. Yellowing of the pulp was determined by irradiating with a quartz lamp (provided with a filter, yielding light of 366 mμ) at 13.5° and 67% R.H. (IV) bleached with 0.5, 2, and 5% (I) dropped to the original brightness within two, six, and eight hours, respectively. Unbleached (IV) within eight hours dropped to 47.7% brightness. Actually the greatest percentage drop in brightness after eight hours was manifested by (IV) bleached with 5% (I). When heated in the dark in air at 100°, very little yellowing occurred. Loss on bleaching with (I) was only about 0.75%. The lignin content of bleached (IV) was 0.52% lower than that of unbleached (IV). The physical composition of (IV) bleached with (I) showed only slight changes, and the relative decrease in screenings was greatest (17%). Other changes included a slight relative decrease in long fibers, a very slight increase in medium and short fibers and an almost negligible increase in fine stuff. (IV) sheets formed after bleaching with (I) showed no perceptible changes in sheet density, thickness, breaking length, or bursting strength, over those of the unbleached (IV), but suffered somewhat in folding endurance and endurance bending numbers. In all of the preceding experiments, tap water was used; distilled water, however, was shown to give considerably higher brightness values, and the importance of the character of the water is emphasized. Extensive bleaching experiments under controlled conditions with varying percentages of aqueous (II) at 20° at 17% stock density show that in no case was the brightness of (IV) increased to 62% and that with 2% (II), after 16 hours, irrespective of temperature and stock density, this brightness never exceeded 59.2%. Irradiation caused a decrease in brightness to that of the original (IV) within two hours. Brightness achieved within one hour with 5% (III) at 20° at 5% consistency was practically identical with that attained by (II) within 16 hours. With (III), the loss in brightness on irradiation was marked. Comparative results with (IV), bleached with (I), (II), and (III) before and after irradiation, are tabulated and fully discussed. In all cases, bleached pulps when irradiated show a greater percentage loss in brightness than does the unbleached (IV). Relative cost data are given of the three agents; (II) is the cheapest. 6 tables, 20 graphs, and 33 references. L.E.W.

BOARD

ANON. Thickness of board. Allg. Papier-Rundschau no. 11: 553-4 (June 15, 1950). [In German]

Calculations and conversion tables for boards of different quality and basis weight in sizes other than the German standard sizes are presented. Brief definitions of hand- and machine-made leather and binder's board, handmade wood-pulp board, and straw board are given. 2 tables. E.S.

BESTER, S. The manufacture of paperboard. Australian Pulp & Paper Ind., Tech. Assoc., Proc. 3: 279-91; discussion: 291-3 (December, 1949).

The author describes the manufacture of paperboard in an Australian mill which uses waste paper, straw, steamed eucalyptus groundwood pulp, imported mechanical and chemical pulps, and eucalyptus chemical pulp as raw material. 4 figures. E.S.

HIGGS, A. C. Wallboard manufacture. Australian Pulp & Paper

Ind., Tech. Assoc., Proc. 3: 294-318; discussion: 318-21 (December, 1949).

The selection of equipment and processes is largely governed by the raw materials available and by the density of the products. Density ranges from 8 to 60 lb./cu. ft. At the lower values insulating properties predominate; these give way to strength and rigidity as the density increases. When it is realized that the wet sheet may be formed in thicknesses up to six inches, it is apparent that the stock demands rapid water-draining properties. Stock preparation by means of rotary digesters, Bauer-type attrition mills, and the Asplund Defibrator is discussed. The formation of the wet sheet on the Fourdrinier and rotary vacuum machines is described. Drying of the wet sheet covers the tunnel-type drier for insulating board and the heated platen press for the more dense boards. 2 tables, 11 figures, and 1 reference. E.S.

BOARD—COATED

BROWN, B. F. Production and conversion experiences in machine coating of board on the Pacific Coast. Paper Mill News 73, no. 28: 54, 56 (July 15, 1950).

A brief description of the Champion coating installation on a six counter-flow-vat board machine making coated and uncoated grades of high-quality folding cartons at the Vernon Division of Fibreboard Products, Inc. is given. The stages are discussed through which the mill has progressed toward the production of a high-quality product suitable for lithographic and letterpress printing. Some of the problems encountered in the conversion, notably in gloss ink printing and scoring, and their solutions are outlined. 1 reference. E.S.

KINDIG, HARRISON. Experiences in the development of coated board. Paper Mill News 73, no. 28: 60, 62 (July 15, 1950).

The experiences of the Mac Sim Bar Paper Co. with the installation of two Champion coating units on one of their board machines four years ago are described. Of the many and varied problems during this period, some have been solved satisfactorily, whereas others still demand attention. E.S.

BOARD—CONDITIONING

ANON. New conditioning plant for pressed wood fiberboards. Norsk Skogind. 4, no. 5: 148-9 (May, 1950). [In Norwegian]

A brief illustrated description is given of a new Norwegian fully automatic heat-treatment and conditioning plant for pressed wallboard which started operation in March, 1950. It consists of a chamber, 42 m. long, with 24 flights of roller conveyers, and is subdivided into a drying, cooling, and conditioning zone. 2 illustrations and 1 diagram, giving a side and floor elevation. E.S.

BOARD MILLS

PORTER, RICHARD W. Fibreboard builds first kraft mill in California. Paper Ind. 32, no. 4: 382-8 (July, 1950); *cf.* B.I.P.C. 20: 777-9.

An illustrated description of the new mills is given; see previous references. E.S.

PULP & PAPER. New St. Joe features, also Texas plant description. Pulp & Paper 24, no. 8: 48, 50, 52 (July, 1950).

An illustrated description is given of the expansion and improvement program of the Port St. Joe, Fla. kraft board mill, including the installation of a third turbogenerator, new Oliver pulp washers of the Ringvalve type, and several new installations on the Beloit Fourdrinier machine. Reference is also made to the new converting plant of the company constructed in Houston, Texas in 1949, and its equipment for making corrugated boxes and linerboard containers. 11 illustrations. E.S.

BOARD MILLS—WASTE LIQUOR

BLOODGOOD, DON E. Development of a method for treating strawboard wastes. Tappi 33, no. 7: 317-20 (July, 1950).

The previous work on the anaerobic digestion of strawboard wastes is discussed, and the conclusions are given. The next step in studying the problem was the designing of a pilot plant. The necessary considerations that must be taken into account in designing, locating, and constructing a pilot plant are pointed out. In order to conserve digestion tank capacity it was decided to treat only rotary-beater-washer wastes by the anaerobic process, because it was believed that the machine wastes would be about equal in waste concentration with the effluent from the anaerobic process. The anaerobic digestion process was started with digested sewage sludge. The details of starting the process are given. The available waste to be treated had a B.O.D. of 3560 p.p.m., as compared with a B.O.D. of 955 p.p.m. for the total waste used in the laboratory tests. The removal of total solids and B.O.D. obtained by primary sedimentation were 21.6 and 31.0%, indicating quite effective treatment by sedimentation. The digestion tank was maintained at about 33° C., which is approximately the average temperature of the waste being treated. The B.O.D. reduction amounted to 0.0475 lb./cu. ft./day with the production of an effluent with a B.O.D. of about 135 p.p.m. The main difficulty in operation has been the bulking of the sludge. This resulted in a problem in sedimentation in the secondary settling tank. This difficulty was not believed to have been caused by the accumulation of solids, because data indicated no increase in solids concentration in the digestion compartments even with no wasting of sludge. Laboratory tests have been conducted to determine the relative values of ferric chloride, aluminum sulfate, ferric sulfate, and straw pulp as aids in filtering primary sludge. The indications are that all these agents make the sludge filterable. On the basis of known methods, estimates have been made of plant sizes in order to present a better idea of the plant that would be required if it were to be built today. It would seem advisable to continue studies to see if material reductions in treatment units and costs of operation can be made. 3 tables and 2 references. E.S.

BOARD TESTING—PHYSICAL

QUINN, DON L. The flat crush test of corrugated container board. Shears 68, no. 691: 46 (July, 1950); *cf.* B.I.P.C. 20: 804.

Evidence is presented to show that the flatwise crush test of a specimen of double-faced corrugated board is in no way a criterion of shipping-container performance; higher test readings indicate only that it is easier to print the board without crushing the flutes. E.S.

TECHNICAL ASSOCIATION OF THE PULP AND PAPER INDUSTRY. Thermal conductivity of structural insulating board. Tappi 33, no. 7: 85-8A (July, 1950).

The test of TAPPI Tentative Standard T 1000 m-50 is given, which is a

slight modification of the A.S.T.M. Designation C-177-45, "Standard method of test for thermal conductivity of materials by means of the guarded hot plate." 2 tables, 1 diagram, and 4 references. E.S.

THWING-ALBERT INSTRUMENT COMPANY, *Philadelphia.* New laboratory corrugator eliminates test variables. Am. Boxmaker 39, no. 7: 33 (July, 1950).

Standardization of testing procedures for corrugating materials is aided by a new laboratory paper corrugator, which assures a nearly perfect sine-wave flute. Steel pins are evenly spaced by vertical pull rods, and they press the paper into grooves, holding them in position while adhesive is applied to the crown of the flutes. An electric heating element may be added for rapid drying and molding. 1 illustration. J.A.B.

CALCULATIONS

H. E. MESSMER LIMITED. Gristwood Paper Equivalator. World's Paper Trade Rev. 133, no. 21: 1460 (May 25, 1950).

This calculator is a lightweight instrument which consists of three disks; the center one of celluloid is approximately five inches in diameter and is sandwiched between two smaller disks of aluminum. It affords the user a quick and accurate means of determining equivalent substances of paper and board and permits numerous conversions peculiar to the paper trade. E.S.

CASEIN

HOUGEN, LEIF, and HIPP, N. J. Plastic flow properties of casein. J. Colloid Sci. 5, no. 3: 218-27 (June, 1950).

Plastic flow measurements of commercial and laboratory-prepared caseins were made with the Rossi-Peakes flow tester. Flow properties of casein samples containing different amounts of moisture were determined at temperatures from 50 to 140° C. and pressures from 500 to 3000 p.s.i. Only minor differences were found in the "flow temperature." The transition in flow properties, corresponding to a water content of about 21%, as described by Haller, could not be demonstrated. A tridimensional diagram for rennet casein is presented which illustrates the temperature, pressure, and water-content requirements necessary to obtain a given plastic flow. 2 tables, 5 figures, and 6 references. E.S.

CELLULOSE—CONDUCTIVITY

GORING, D. A. I., BIEFER, G. J., and MASON, S. G. Electrokinetic properties of cellulose fibers. III. Note on the low frequency dispersion of electrical resistance. Can. J. Research B 28, no. 6: 339-44 (June, 1950).

Sulfite cellulose, rayon cellulose, and silk fibers in the presence of 10^{-4} *N* potassium chloride show a 20 to 25% decrease in electrical resistance between 0 and 100 cycles per second. An additional but smaller decrease occurs between 100 and 15,000 cycles per second. The systems also show a marked capacitive reactance. Reversal of the sign of the zeta-potential in sulfite fibers destroys the effect. Nonswelling fibers such as asbestos, glass, and acetate rayon, slightly swelling nylon, and moderately swelling wool show no comparable behavior. It is evident that the phenomenon is related to the swelling properties of the systems, but it cannot be concluded whether it is associated with the surface or the interior of the swollen fibers. 4 tables, 1 figure, and 9 references. E.S.

GORING, D. A. I., and MASON, S. G. Electrokinetic properties of cellulose fibers. I. Stream potential and electro-osmosis. Can. J. Research B 28, no. 6: 307-22 (June, 1950).

Stream-potential, electro-osmotic, and permeability measurements were made on cotton pads in the presence of distilled water. Several sources of irreproducibility have been eliminated from the usual experimental methods of measuring the zeta-potential. Uniform packing of the pad has been shown to be important. The Briggs method of evaluating the "pore factor" by electrical conductivity measurements was found to be invalid. An alternative method of determining the factor is proposed, based on an assumed value for the pore orientation factor and an indirectly measured value of the swollen specific volume of the fibers. The latter can in principle be determined by measuring one of the electrokinetic functions or the permeability coefficient over a range of pad concentrations. When pads of different concentration were used, the stream-potential, electro-osmotic, and permeability functions were found to vary erratically in the same manner, an effect which, it has been concluded, originates from lack of uniform packing of the pad. The electro-osmotic measurements were found to require a large correction for capillary electro-osmosis, a source of error which has been overlooked by other workers. The ratio of the zeta-potential calculated from electro-osmosis to that from the stream potential was greater than unity and increased with an increase in pad concentration. 1 table, 6 figures, and 13 references. E.S.

GORING, D. A. I., and MASON, S. G. Electrokinetic properties of cellulose fibers. II. Zeta-potential measurements by the stream-compression method. Can. J. Research B 28, no. 6: 323-38 (June, 1950).

A new technique of measuring the zeta-potential of cellulose fibers is described in which stream current-potential measurements are carried out over a range of solid concentrations on a single pad. In employing the stream-potential method it is necessary to measure the d.c. resistance of the pad, since a pronounced dispersion effect yields a.c. resistance values which are in considerable error. Reversible electrodes must therefore be used and since stream-current measurements can then be carried out, this simpler method is preferred. Degrees of swelling calculated from the stream data are consistently higher than those calculated from permeability measurements. This discrepancy indicates a serious limitation of the conventional electrokinetic theory when applied to swollen cellulose. A model of the fiber-liquid interface, consisting of partially dissolved electrically charged cellulose chains accounting for the observed discrepancy, is discussed. If this model is applicable, the physical significance of the zeta-potential becomes extremely complex. 5 tables, 8 figures, and 18 references. E.S.

CELLULOSE—DEGRADATION

BONE, W. A., and TURNER, H. A. Some effects of the evaporation of water from cotton cellulose. J. Soc. Dyers Colourists 66, no. 6: 315-27 (June, 1950); *cf.* B.I.P.C. 5: 56.

Experiments with purified cellulose, air, and water indicate that an increased activity of the system is shown at the so-called "water-line." This is the narrow boundary region between wet and dry cloth which is formed when the lower end of a strip of bleached cotton fabric is dipped in water. Evidence is brought forward to show that the cotton cellulose is modified to give two distinct types of product: (a) one, soluble and transportable in

water, brown in color, markedly fluorescent in ultraviolet radiation, with enhanced reducing properties; (b) the other, solid, nontransportable in water, restricted to the boundary region, with higher cuprammonium fluidity and methylene blue absorption than the original cellulose. The action is not originated, nor does it seem to be greatly affected, by light energy. Wide variations in the partial pressure of oxygen in the surrounding atmosphere cause little change in the apparent intensity of the brown line. 6 tables, 1 figure, and 19 references. E.S.

CELLULOSE—HEMICELLULOSE

BENNETT, EMMETT. The significance of the fractionation of hemicelluloses of cornstalks. Arch. Biochem. 27, no. 1: 99-101 (June, 1950).

In general, the hemicellulose fraction most difficult to extract is characterized by the lowest percentage content of methoxyl and uronic acid anhydrides, and the highest percentage content of pentosans, the greatest number of sugar residues per nonreducing end group, and consequently, the highest apparent molecular weight; it is, therefore, considered significantly different. The sugars seem to be linked by either the 1, 2- and/or 1, 4-glycosidic linkage, in which the beta configuration predominates. 2 tables and 7 references. E.S.

CELLULOSE—SOLUBILITY

BORGIN, KARL, and STAMM, ALFRED J. The exchange of radioactive zinc between cellulose and sodium hydroxide-sodium zincate solutions. J. Phys. Colloid Chem. 54, no. 6: 772-7 (June, 1950).

Davidson (*cf.* B.I.P.C. 7: 254-5) has shown that the addition of relatively small amounts of zinc oxide to concentrated solutions of sodium hydroxide, forming a sodium zincate solution, greatly increases the swelling and solvent power of the alkali for cellulose. The question arises as to whether the zinc complex is physically adsorbed, or whether it reacts chemically with cellulose. Experiments were conducted on the exchange of radioactive Zn^{65} in an attempt to answer this question. The results indicate that radioactive Zn^{65} in the form of sodium zincate dissolved in concentrated sodium hydroxide can be rapidly removed from cotton by exchange into an inactive solution of identical concentration and by exchange into a more concentrated solution counter to the inward diffusion under a concentration gradient. In the latter case, inward diffusion hinders exchange for the first minute, while equalization of concentrations is occurring. Exchange during the next four minutes into the second solution is relatively faster, as more radioactive zinc remains in the cotton for exchange. Exchange into the third and fourth solutions is about the same. Diffusion into water is more rapid at first than the exchange into the same concentration of inactive solution because of the diffusion potential. Diffusion slows down, however, as both sodium hydroxide and sodium zincate are removed from the cotton as a result of the shrinkage of the cotton and a reduction in the cross section effective for diffusion. In no case do breaks occur in the curves that would result if slowly dissociating zinc compounds were formed. If compound formation does occur, the reaction must be more rapidly reversible than the exchange and the diffusion (96% complete in five minutes). 1 table, 3 figures, and 12 references. E.S.

CELLULOSE ETHERS

BAYLEY, C. H., and WEATHERBURN, A. S. The influence of sodium carboxymethyl cellulose on the suspending power of built

soap solutions. Textile Research J. 20, no. 7: 510-13 (July, 1950).

The influence of sodium carboxymethylcellulose (CMC) on the ability of soap solutions to prevent the deposition of carbon black on fabric during the detergent process has been studied. It was found that the presence of alkaline builders (sodium carbonate, modified soda, sodium metasilicate, and sodium orthosilicate) resulted in a decrease in the suspending power of soap solutions. The addition of CMC to such built soap solutions compensated to a considerable extent for this reduction in suspending power caused by the builder, although in no case did the suspending power equal that of the unbuilt soap. The maximum improvement in suspending power was obtained with a CMC concentration of 0.005%; i.e., 5% of the weight of soap used. In general, those builders which caused the greatest depression in the suspending power of the soap solution also showed the greatest improvement in suspending power on the addition of CMC. 1 table, 5 diagrams, and 4 references. E.S.

CHEMICAL TESTING—BLEACHING AGENTS

HÖPNER, THEODOR. Determination of chlorate-chlorine in waste (bleach) liquors. Das Papier 4, no. 12: 249-54 (June, 1950). [In German]

Various methods for chlorate-chlorine (I) determination were examined with a view toward their application to liquors containing appreciable amounts of organic matter and other oxidizable impurities. Such liquor samples (containing not more than 20 mg. of (I) per 250 ml.) were preoxidized with sufficient equivalent amounts of *N* potassium permanganate and *N* sulfuric acid at room temperature to insure an excess after 24 hours, but complete decolorization within two days. With persisting potassium permanganate, the excess was destroyed cautiously with very dilute hydrogen peroxide. The residual active chlorine in the alkalinized preoxidized solution was then determined by Pénot's method with 0.1 *N* arsenious acid or 0.1 *N* bisulfite. The solution was transferred to a round-bottom flask and then refluxed 10 minutes under an air condenser with 25 ml. of a solution containing 56 grams of ferrous sulfate and 200 ml. of sulfuric acid per liter; the top of the condenser was tightly stoppered and the mixture gradually cooled so as to insure a vacuum in the flask. To the cold mixture was added 60 ml. of a solution containing 67 grams of manganese sulfate, 33 ml. of phosphoric acid (density 1.3) and 133 ml. of concentrated sulfuric acid per liter and titrated with 0.1 *N* potassium permanganate (using Ferroin to accentuate the end point). The amount of 0.1 *N* ferrous sulfate consumed multiplied by 3.55 equals the chlorine loss in mg. caused by sodium chlorate formation (each six atoms of chlorine equivalent to one mole of sodium chlorate). The author's method was shown to be quite accurate and precise, and a marked improvement over those of Schwalbe and Wenzl, Prelinger, and Rys (*cf.* Papier-Fabr. 24: 625-7 [1926]), although in a number of instances, the critically tested Rys method gave results comparable with those obtained by the author's technique. However the Rys procedure is not suitable for determining small amounts of (I) in the presence of excessive amounts of organic matter. L.E.W.

CHEMICAL TESTING—PAPER—TITANIUM

WILLIAMS, F. R. The estimation of TiO_2 in paper. Paper-Maker (London) 119, no. 5: 340-2, 344 (May, 1950).

In the paper industry the analysis of titanium is required to test the purity of the raw material bought as a pigment, to check the titanium content of the paper stock or coating mix, and to check the amount of titanium in the

finished paper. The details of a suitable gravimetric and volumetric and of two colorimetric methods (a visual procedure with the Lovibond Nessleriser and a photoelectric one with a Spekker absorptiometer) are described. The gravimetric and volumetric methods are more accurate, but much more time-consuming; in cases where the titanium content is rather low, the more rapid colorimetric estimation may be sufficient. 4 figures and 4 references. E.S.

CHEMICAL TESTING—PULP

GUSTAFSSON, G. RURIK. A literature review of the methods for determining lignin content, cooking degree, and bleachability of pulp. Paper and Timber (Finland) 32, no. 4a: 45-50; no. 5: 145-51; no. 6: 177-85 (special issue, April; May, June, 1950). [In Swedish; English summary]

Following a brief discussion of the general characterization of sulfite pulps, the different methods for determining lignin content, cooking degree, and bleachability are reviewed, with particular reference to their intercorrelation. The need for international co-operation for the standardization of these methods is emphasized. The chronologically arranged bibliography at the end contains 361 references. E.S.

CHEMICAL TESTING—PULP—MERCURY

GRAN, GUNNAR. Determination of phenylmercuric acetate. Svensk Papperstidn. 53, no. 9: 234-6 (May 15, 1950). [In English; German and Swedish summaries] Correction: no. 12: 330 (June 30, 1950). [In English]

Two methods for the determination of phenylmercuric acetate are described. For determination in commercial products, the phenylmercuric ions are precipitated with an excess of potassium iodide solution; the excess of iodide is oxidized with bromine; excess bromine is destroyed with formic acid and, after the addition of sulfuric acid and potassium iodide, the amount of iodate formed is determined by titration with sodium thiosulfate and starch mucilage as an indicator. In a colorimetric method for the determination of very small amounts of phenylmercuric ions, dithizone at pH 5 is added to the phenylmercuric acetate solution, and the mixture is shaken violently 50 to 60 times. The color intensity is measured in a suitable instrument at a wavelength of 481 mμ. 4 tables and 7 references. E.S.

JOHANSSON, AXEL. Determination of mercury in pulps, paper, white water, etc. Svensk Papperstidn. 53, no. 9: 231-3 (May 15, 1950). [In English; German and Swedish summaries]

Several methods for determining small quantities of mercury compounds in biological material were investigated, and Maren's procedure (*cf.* J. Lab. Clin. Med. 28: 1511-14 [1943]) was modified and adopted by the analytical department of the Swedish Forest Products Research Laboratory. It gives the sum of organic and inorganic mercury and is suitable for solid and liquid samples. The wet combustion of the pulp or paper samples with a mixture of concentrated sulfuric and nitric acids is followed by shaking the remaining solution in a separatory funnel with dithizone in chloroform at pH 1.0 (at which pH other metallic ions present do not interfere). Liquid samples, such as white water, are first precipitated with hydrogen sulfide, and the precipitate in then treated in the same manner as the solid samples. The quantity of mercuric dithizonate formed (which is sensitive to direct sun-

light and must be protected from it) is measured colorimetrically or titrimetrically. 1 table and 7 references. E.S.

CHEMICAL TESTING—SULFUR DIOXIDE

ATKIN, SYDNEY. Determination of sulfur dioxide in presence of sulfur trioxide. Anal. Chem. 22, no. 7: 947-8 (July, 1950).

The author describes an accurate colorimetric method for determining small quantites of sulfur dioxide in gases resulting from the catalytic manufacture of sulfuric acid. The sulfur dioxide and sulfur trioxide from the gas are first absorbed in a 10% sodium hydroxide solution containing 5% glycerol, which effectively prevents oxidation of the sulfur dioxide. This solution is then combined with fuchsin and sulfurous acid, and the intensity of the resulting color is measured in an electrophotometer. Sulfur dioxide in concentrations up to 1 mg. in the scrubbing solution, diluted to 500 ml. at room temperature, follows Beer's law. 2 tables, 1 figure, and 5 references. J.A.B.

CHEMICAL TESTING—WOOD—PENTOSANS

TECHNICAL ASSOCIATION OF THE PULP AND PAPER INDUSTRY. Pentosans in wood. Tappi 33, no. 7: 89-90A (July, 1950).

The text of TAPPI Tentative Standard T 19 m-50 is given. The furfural formed by the action of hot hydrochloric acid on the pentosans in wood is distilled from the mixture according to the method prescribed by the Association of Official Agricultural Chemists (*cf.* "Methods of analysis," 6th ed., p. 412 [1945]), and the distillates are analyzed by either a gravimetric or a volumetric procedure. 1 figure and 1 reference. E.S.

CLAY

EAST, WALTER H. Fundamental study of clay. X. Water films in monodisperse kaolinite fractions. J. Am. Ceram. Soc. 33, no. 7: 211-18 (July, 1950); *cf.* B.I.P.C. 19: 618-19.

Water-film thicknesses in monodisperse kaolinite fractions were determined by direct measurements and compared with those in the gibbsite and quartz systems. The influence of calcium, sodium, and hydrogen exchangeable ions on kaolinite films was investigated and the solid-liquid interface energy was computed by means of the heat of wetting. A mechanism of base exchange and a new concept of the plastic structure are offered. 5 tables, 13 figures, and 20 references. E.S.

CORES

SPELSON, N. J., and RAPPLEYEA, F. A. Aluminum tubing for better paper cores. Paper Mill News 73, no. 28: 86 (July 15, 1950); *cf.* B.I.P.C. 19: 696.

Reference is made to the advantages of aluminum (Reynolds rigid paper core stock) process and shipping paper cores with malleable cast iron end plugs, such as considerably lighter weight and easier handling than iron cores, excellent concentricity, and elimination of rust staining, so that the paper can be used down to the core shell. 1 table and 2 diagrams. E.S.

CORROSION

T. M. CALGON, INC. Corrosion control of calender stack rolls with Micromet. Paper Mill News 73, no. 28: 81 (July 15, 1950).

In systems with low water flow the application of Micromet (a slowly soluble phosphate glass) is recommended for inhibiting corrosion of steel equipment in contact with the water. For instance, in mills where water finishing of paper on the calender stack is practiced, a serious pitting of the rolls is often encountered. Micromet in solution will form a protective film on the surface of the rolls, and this film can be maintained by continuous water treatment. A diagram is included, showing the installation of a Micromet feeder in the water line which feeds the water boxes of the calender stacks; 10 p.p.m. of Micromet will give excellent protection in practically any system. E.S.

ESSEN, CARL-GUSTAV VON. Corrosion problems in sulphate pulp mills. Tappi 33, no. 7: 14A, 16A, 18A, 20A, 22A, 24A, 26A, 28A, 30A, 32A (July, 1950); *cf.* B.I.P.C. 20: 392.

This is a complete translation of the Swedish original. E.S.

OVERBAGH, J. S., and BIRCHARD, W. H. Corrosion in the paper mill. Paper Trade J. 131, no. 4: 26, 28-9 (July 27, 1950).

The author discusses the various factors affecting corrosion, such as hydrogen-ion concentration, oxidizing agents, temperature, the velocity of a corrosive solution, and the use of two dissimilar metals which cause galvanic corrosion. A brief reference is made to the corrosion problems of white-water pumps and piping, the paper machine, including the hood, and metal window frames, and to the increasing use of nonmetallic, protective coatings over a metal base. 2 tables and 3 references. E.S.

COST—ACCOUNTING

BRETT, J. L. Cost determination and control in the pulp and paper industry. Australian Pulp & Paper Ind., Tech. Assoc., Proc. 3: 374-82; discussion: 383-6 (December, 1950).

The author deals briefly with the principles of cost determination with particular reference to the system used by Australian Paper Manufacturers Limited. The use of "Budget" and "Standard" costs in facilitating control of costs and in facilitating business control from cost reports based on these is illustrated. The classification of unit costs is discussed, and the disadvantages of what are termed "historical cost" methods are stressed. The advantages obtained from the use of standard costs and the method of fitting these into the budgetary control system are explained. The assistance that management can receive from cost reports and the limits to the value of reports for certain special purposes are explained; in conclusion, the author adds a warning on the necessity for close supervision of the cost of obtaining cost data. E.S.

DIELECTRICS—TESTING

SKOW, NORMAN A., and BELSTERLING, C. A. Dielectric fatigue of thermoset laminates. Modern Plastics 27, no. 11: 93-4, 158, 160, 162 (July, 1950).

Dielectric fatigue tests were run on each of several grades of thermosetting plastic laminates (paper base X, XX, XXXP; fabric base LE; asbestos-paper base A, and glass base G-5). Breakdown voltage was plotted against time. The data obtained indicate that for a given temperature, thickness, and conditioning, a limiting voltage exists below which fatigue will not occur for an indefinite period of time. Tests of this type yield results

which are helpful in the design of insulating components for electrical equipment. 4 tables, 6 figures, and 5 footnotes. E.S.

DRYING—PAPER

COR. WFLS. Control of the moisture content of paper during its manufacture. Wochbl. Papierfabr. 78, no. 11: 304 (June 15, 1950). [In German]

The author emphasizes the fact that not only the final moisture content of a paper, but also the entire course of the drying progress is decisive for the quality and applicability of the final product. The temperature in the drying cylinders must increase gradually and continuously, and excessive temperatures, particularly in the first driers, must be carefully avoided. Overheated and insufficiently heated cylinders produce equally poor results. Reference is made to an instrument (built by Höpfel, Köhler & Co., Chemnitz) for indicating the surface temperatures of each drying cylinder; the installation requires the individual regulation of the steam feed of each drier. E.S.

SANDS, R. G. Drying methods and the condition of paper. Paper-Maker (London) 119, no. 6: 421-6, 428-9 (June, 1950); World's Paper Trade Rev. 133, no. 21: 1467-76 (May 25, 1950).

The author emphasizes the close relationship between the drying process and the final condition of the finished product. Attention is drawn to the fact that, on the one hand, moisture is removed from the paper web as it is manufactured and, on the other hand, for optimum results, a subsequent process is used to add moisture to the paper. Although this may be essential for certain high grades and classes of paper, consideration should be given to the necessity and desirability of employing these two diametrically opposed processes in all cases. The possibilities for effecting drying economies in existing buildings without expensive alterations of constructions on the drier part of the Fourdrinier machine, the Yankee machine, and tub-sized air driers are discussed; reference is made to the zone-type multiple control or Barbour drier for the production of special finishes. Separate conditioning and maturing units are described, which operate at comparatively low speed and not at the same rate as the paper machines. The cycle conditioner with a cooling and a conditioning chamber (*cf.* B.I.P.C. 11: 279) represents a definite improvement, which permits web speeds through the unit similar to those of the producing machines. Mention is also made of developments on festooning and straight-path driers for clay and synthetic coatings. Careful consideration must be given to the ranges and types of production contemplated for these units, because there is a limit to their versatility. 11 diagrams and 9 references. E.S.

DYES AND DYEING

ANON. Colors that stay put. Du Pont Mag. 44, no. 3: 22-3 (June-July, 1950).

Reference is made to the use of nonbleeding, fast-to-light pigments developed by Du Pont for coloring wallpaper which will withstand repeated washings, gift wrappings, shipping tags and labels, tags for tea bags, and coated and other decorative papers. E.S.

SUNDSTROM, F. O., and STEARNS, E. I. Practical art of color matching on paper. Paper Mill News 73, no. 26: 12-15; no. 27:

12, 14 (July 1, 8, 1950); Paper Trade J. 131, no. 2: 24-6, 28-30 (July 13, 1950).

The authors present a description of color differences, the nomenclature used to describe hue variation, acid dyes commonly used for calender staining, the color of mixtures of dyes, a match and an alternate match for a standard blue, three dyes to produce a brown, four dyes to produce a black, the correction of off-color lots, a green corrected by one and by two dyes, and the formulation of a new color match. The purpose of the article is to explain the relation of the art of color handling (acquired only by years of experience and practice) to sound scientific principles and facts, so that the colorist will be better able to utilize the dyes with which he comes in daily contact. 8 diagrams. E.S.

ELECTRIC PRECIPITATIONS

FOGMAN, CARL-BERTIL. The operation and control of electric precipitators in sulfate mills. Svensk Papperstidn. 53, no. 12: 327-30 (June 30, 1950). [In Swedish; English summary]

Following a brief introduction dealing with the theory of electrical precipitators, the special operating conditions for those installed in sulfate mills and the factors affecting their efficiency, notably gas and dust-particle velocities, are discussed. The efficiency improves with increased velocity of the dust particles from the discharge to the collecting electrodes; this velocity depends upon the size of the dust particles and the voltage maintained between the electrodes; the voltage, in turn, is influenced by the efficiency of the vibrators of the collecting electrodes and a certain minimum relative humidity of the gas. An increased gas velocity (principally caused by a leakage in the recovery unit) decreases the efficiency and vice versa. Corrosion may be reduced by preheating the precipitator before starting it. The cleaning of the economizer and air preheater with water increases the dew point of the gas and forms another source of corrosion. A good insulation of the entire unit is essential. The construction of the collecting electrodes of stainless steel or aluminum will improve corrosion conditions. The gas must be uniformly distributed throughout the effective section of the precipitator. The insulators which support the discharge electrodes should be installed outside the gas flow and electrically heated to avoid condensation and current leaks. E.S.

EMULSIONS

BROWN, GEORGE L. Polymer emulsion economies spur widening use. Chem. Inds. 67, no. 1: 38-40 (July, 1950).

Because they are relatively inexpensive and safe, and their properties are easily controlled, emulsion polymers are being adopted wherever possible in coating, impregnating, binding, and adhesive uses. Application techniques, including the use of plasticizers, latex thickeners, and pigments, are described, and some of the limitations in the use of these polymers are mentioned. In paper coating applications, where a continuous surface film of minimum coating weight is important, the resin content and viscosity of the emulsions must be carefully controlled. 2 tables and 1 illustration. J.A.B.

EUCALYPTUS

TURNBULL, R. F. The taxonomy, harvesting, processing and utilization of eucalyptus trees in Australia. Econ. Botany 4, no. 2: 99-131 (April-June, 1950).

Among the 500 species known in Australia, about 60 have attained economic importance, particularly for building purposes, but also as sources of pulp, tannin, and oils. The classification and occurrence, logging techniques, utilization, and properties of the eucalypts are described. Brief paragraphs are devoted to the manufacture of pulp and paper and building boards. 4 tables, 20 illustrations, and 11 selected references. E.S.

FOLDING BOXES

ANON. The feel of the product. Modern Packaging 23, no. 11: 88-9 (July, 1950).

Industrial quality sandpaper for the home workshop has recently been made available in retail packages by the Minnesota Mining & Manufacturing Co. These packages, containing precut abrasive disks, sheets, belts, bands, and refill rolls, feature a die-cut window in the front, so that the customer may see and feel the product before buying. The shape of the window helps to identify the type of sandpaper, and the accompanying cover sketch indicates the probable use of the paper. The new "3M" line comprises seven basic unit packages of the flap-lock, one-piece folder type, 15 assorted boxes, and one display counter. 5 illustrations. J.A.B.

ANON. Laundry progress. Modern Packaging 23, no. 11: 92-6 (July, 1950).

Two recent packaging developments of interest to laundry operators are a one-piece, lock-tab shirt box and a special machine which automatically supplies precut sheets of wrapping paper from rolls in any of four preselected sizes. This unit, permitting the use of paper in roll rather than sheet form, saves approximately one-half cent per pound on the paper itself and holds wrapping labor to a minimum. The shirt box is made in four depths, is tamper-resistant, and has unusual crushing strength. 1 table and 10 figures. J.A.B.

FORESTS AND FORESTRY

AMIDON, GEORGE B. Status of forestry in the pulpwood industry of the Lake States. Lake States Timber Digest 4, no. 8: 3-4; no. 9: 2-3 (June, July, 1950); *cf.* B.I.P.C. 18: 513-14.

The author extends his previous data to 1947 with additional figures to 1949. Statistical information is given on the size of the industry in Wisconsin, Michigan, and Minnesota, public and private ownership, pulpwood species, allowable drain and actual production, number of foresters employed by the industry, land ownership of companies, and planting programs. In spite of the fact that many of the supply problems are extremely serious, the author believes that the problems can and will be solved. The three major problems are: a further reduction in the use of spruce and the substitution of other species which are in surplus supply, the acquisition of public and private lands which can be purchased and which are suitable for growing pulpwood to the extent of one million additional acres, and the growth of more trees on the 14 million acres in farm woods. 5 tables. E.S.

BONNER, E. Regeneration of spruce and jackpine after cutting. Pulp Paper Mag. Can. 51, no. 7: 134, 136 (June, 1950).

The problem of obtaining spruce regeneration in eastern Canada varies considerably from east to west. In the maritime regions, natural reproduction is fairly satisfactory, but farther inland, conditions change rapidly and an adequate second crop of spruce is exceedingly difficult to obtain, except on

the wet lowland sites. The indications are that seed supply is not the critical factor, but it is rather the moisture conditions during the relatively short periods of germination and establishment. Reproduction of jack pine is generally poor and the principal suggestion for improvement is some method of soil disturbance either by mechanical means or by burning. E.S.

CONNAUGHTON, CHARLES A. Growing timber efficiently. Pulp & Paper 24, no. 8: 62, 64, 66 (July, 1950).

The author emphasizes the fact that there is an efficient, orderly approach to the growing of a timber crop. He discusses the principles of improvement cuts, tree size, and desirable stand volume, as well as hardwood control, the management of well-stocked young stands, and the importance of the source of seed and seedlings, with particular reference to the hereditary advantage of seedlings grown from local seed sources. These broad principles apply equally well to all stands, whether natural or planted. E.S.

FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS. Forest resources of the world. Unasylva 4, no. 2: 57-9 (April-June, 1950); *cf.* B.I.P.C. 19: 160-1.

Since the previous article was published, presenting the results of a survey of forest resources in the various countries, questionnaires have been returned from several additional countries, and this supplementary information is tabulated. 5 tables. J.A.B.

MØRCH, BØRRE. The forest industry and the problems of the engineers seen in relation to the development in North America. Norsk Skogind. 4, no. 5: 136-42 (May, 1950). [In Norwegian; English summary]

The author discusses the distribution of responsibilities of engineers in financial, commercial, and technical matters in Canada, as observed during a recent trip to a number of newsprint mills, and the possibilities of applying some of the economic principles to the forest industries of Norway. E.S.

GLUE AND GELATINE

ANON. The difference between glue and gelatine. Paper & Print 23, no. 2: 230-2 (Summer, 1950).

Glue and gelatin both arise from the collagen in the bone or skin of an animal, but they differ in the way they are extracted and the degree to which they are refined, filtered, and bleached. The quick, low-cost bone-glue process, for example, subjects the bone to rather violent treatment, causing a degradation of the protein and resulting in a lower jelly strength and poorer color than in bone gelatin. The sources and method of extraction of bone glue, hide glues, rabbit-skin glue, chrome glue, and scotch glue are mentioned briefly. 1 figure. J.A.B.

SCHULLER, SAMUEL. Animal glues. Tappi 33, no. 7: 63-4A (July, 1950); Fibre Containers 35, no. 7; 63-4 (July, 1950); Paper Ind. 32, no. 4: 433, 440 (July, 1950).

The author discusses cake-form, nonwarp, flexible grades of animal glues prepared from bone and hide glues, their properties, applications, advantages, and disadvantages. E.S.

GROUNDWOOD PULP

JAEGER, J. C., and SOMERVILLE, J. L. A note on the temperature of wood near the surface during grinding. Australian Pulp & Paper Ind., Tech. Assoc., Proc. 3: 14-21; discussion: 22-3 (December, 1949).

The temperature at finite depths of wood being ground in a pocket is given by the equation $T = T_i + (T_o - T_i)\ e^{-vx/k}$ where T is the temperature of wood, of diffusivity k, at distance x from the grinding face, T_i is the original temperature of the wood, T_o is the temperature at the grinding face, and v is the rate of advance of the wood. The temperature T_o is the same as that of the stock held between lands. The authors found that the wood attains elevated temperatures, above 40° C. for instance, for only the last few seconds of its approach to the stone. The temperature rise of eucalypt fibers lying in and near the surface, which is caused by the energy absorbed during the passage of individual grits, is considered to be calculable if the properties could be ascertained of the zone of plastic deformation that exists under the advancing grit. 2 figures and 4 references. E.S.

LETHLEAN, H. V. Production of mechanical pulp from eucalypt wood. Australian Pulp & Paper Ind., Tech. Assoc., Proc. 3: 1-13; discussion 22-3 (December, 1949).

The author discusses some fundamental principles relative to grinding, and compares the essential differences between the grindability of softwoods and hardwoods with particular reference to the wood-density variables in eucalypts, and the effect of those variables upon uniform quality pulp production. A brief historical review of the grinding of eucalypts in Tasmania and British Columbia is given. A description and some observations are presented of Australian Newsprint Mills' grinder room operations at Boyer, Tasmania, of the Great Northern grinders, and of the technique employed in grinding and the operating difficulties encountered. Some comparative comments regarding the Great Northern grinder and the ring grinder, together with a brief description of the latter, are presented. 4 figures and 1 reference. E.S.

NEALE, F. R., PEARSON, A. J., and SOMERVILLE, J. I. The brightening of eucalypt groundwood by pretreatment with acid and extraction with caustic soda. Australian Pulp & Paper Ind., Tech. Assoc., Proc. 3: 24-45; discussion: 45-6 (December, 1949).

A study was made of conditions for brightening eucalypt groundwood by pretreatment with acid, extraction with caustic soda to remove coloring matter, and acidification with sulfur dioxide and sulfuric acid. The pretreatment with acid is effective in removing substances including calcium and magnesium which interfere with the alkali extraction. Conditions of treatments giving maximum increase in brightness, consistent with practical considerations, were the use of 1% of sulfuric acid in the pretreatment, extraction with 1.25% of caustic soda at 60° C. and 5% stock concentration for 20 minutes, and acidification with 0.2% of sulfur dioxide and sufficient sulfuric acid to adjust the pH to 5 (the quantities of chemicals being expressed in relation to the moisture-free weight of pulp). With these conditions, increases in brightness of 6 to 7 units were obtained on the laboratory scale with mill-produced groundwoods. The yield was 97 to 98%. Without the acid pretreatment these increases would have been 2½ to 3 units less. The brightness of eucalypt groundwood, both untreated and treated by the above process, is

decreased by the presence at pH 5 of the ions of common di- and trivalent metals. 3 tables, 7 figures, and 6 references. E.S.

SCHAFER, E. R., and HYTTINEN, A. The groundwood pulping of mixtures of white spruce and quaking aspen. Tappi 33, no. 7: 335-7 (July, 1950).

Groundwood pulping experiments were made on quaking aspen, white spruce, and three mixtures of these woods. As the amount of aspen in the mixture was increased, the motor load remained constant but the grinding rate increased, energy consumption decreased, freeness increased, and strength decreased. These relationships were linear, or nearly so, in most instances. The properties of mixtures of spruce and aspen groundwood pulp were, in general, the same whether the woods were ground together or ground separately under the same conditions of grinding. 2 tables and 2 diagrams. E.S.

GROUNDWOOD PULP, STEAMED

BRECHT, WALTER, and KILPPER, WILHELM. The influence of the technological working conditions on the steamed groundwood process. Das Papier 4, no. 12: 240-9 (June, 1950). [In German]

Blocks of spruce (I) and pine (II) (8 × 10 × 11 cm.) after treatment with saturated steam (4.7 atmospheres and 158° C.) for 1.5, 3, 5, 8.5, and 14 hours were stored 1-1.5 days and ground with a Pirna (burring AO) pulpstone under a grinding pressure of 1.53 kg./sq.cm., a stone speed of 16.8 m./sec., and a temperature of 48-49° and a consistency of 2.4% in the pit. Steaming caused sharp loss in brightness (from an initial brightness of 52% to 7% after 12 hours). Initial swelling in (I) rose sharply during the first 1.75 hours, then dropped and rose again; after three hours it remained relatively constant. Qualitatively the same effects, although less markedly, occurred with (II). Both (I) and (II) showed a steady rise in the percentage of water with steaming time. Loss in weight of (I) and (II) with time is a nearly linear function. After steaming 12 hours, the loss in weight of (I) was 17%, that of (II), 21%. With increased steaming time, the efficiency of the grinder increased, and power requirements decreased. Steaming caused a decrease in slowness, less marked in (II) than in (I). In contrast to unsteamed groundwood, a mechanical fractionation of steamed groundwood showed a higher proportion of the longer fibers. With (I), the length of steaming was correlated in the first two hours with a sharp increase in tensile strength, burst, tear-through, and density of the test sheets, with slight increases thereafter (up to 6-8 hours steaming), followed by decreases in strength after steaming 8-10 hours. Concomitantly there was a very sharp initial drop in air permeability during the first two hours, followed by a gradual rise. The brightness of the groundwood decreased markedly with steaming, but pulp sheets invariably showed a higher brightness than did the sections of steamed wood. Further losses in weight were noticed after grinding steamed wood. Thus the total loss was 32% for (I) and 25% for (II). In general the over-all groundwood pulp quality of (I) was better over a constant four-hour period than that of (II), although the brightness was not noticeably different. Extensive studies were also made on the influence of groundwood of steam temperature and pressure. With rising temperatures, the water content in (I) increased gradually, whereas that of (II) rose sharply to a maximum at 130°. Swelling was far more marked in (I) than in (II), reaching a maximum at about 140°. Losses in weight were slight at 130°, but rose sharply at higher temperatures, especially in the case of (II). An increase in steam temperatures caused:

increased darkening (resulting in a brownish-black pulp); a regular decrease in power consumption; a regular decrease in output up to steam temperatures of 148-150°, followed thereafter by a steady rise; a sharp rise in slowness to a maximum at 150° followed by a sharp decrease at higher steam temperatures; a steady increase in medium fiber lengths (with temperatures up to 160°), followed by a decrease at higher temperatures; a rise to a maximum breaking length at 150°; and a steady, sharp rise in sheet density. The weight per unit volume was somewhat greater with brown groundwood than with standard groundwood. 13 graphs, 1 table (showing the difference between groundwood at 158° using varying time periods with that formed within four hours at different steam pressures), and 6 footnotes. L.E.W.

GUMS AND RESINS

HOUGH, L., and JONES, J. K. N. The structure of *Sterculia setigera* gum. Part II. An investigation by the method of paper partition chromatography of the products of hydrolysis of the methylated gum. J. Chem. Soc.: 1199-1203 (April, 1950); *cf.* B.I.P.C. 19:474; 20:485.

Sterculia setigera gum has been converted into its fully methylated derivative, which on hydrolysis gives 2,3,4,6-tetramethyl-D-galactose (6 parts), 2,3,6-trimethyl-D-galactose (3 parts), 3,4(?)-dimethyl-L-rhamnose (4 parts), 2- and/or 3-methyl-L-rhamnose (3 parts), 2,6-dimethyl-D-galactose (traces), L-rhamnose (traces), and 2-methyl-D-galacturonic acid (16 parts), in the approximate proportions indicated. E.S.

HARD WOODS

ANON. A Peruvian paper making material. Paper-Maker (London) 119, no. 6: 414 (June, 1950).

Brief reference is made to the pulp and papermaking possibilities of Cetico, a tropical hardwood, found in the jungles of the upper reaches of the Amazon. Laboratory-scale trials by the Cellulose Development Corporation (Celdecor) and mill trials in an Italian mill gave technically satisfactory results, so that plans for the erection and operation of a pulp mill in the Amazon district of Peru have been made. For a start, only mechanical pulping will be considered in view of the lack of industrial development in that area. E.S.

HEATING

DUFF, C. H. Test of camp heating stoves. Pulp Paper Mag. Can. 51, no. 7: 140, 142 (June, 1950).

A test designed to show the relative efficiency of different types of heating stoves was conducted at a camp operated by the Canadian International Paper Co., using normal firewood billets. The stove experiments are continued with hogged fuel and sawdust. Data on some of the results are given. E.S.

INSECTS AND VERMIN

STEVENS, D. R., and PREBBLE, M. L. The battle of the budworm. Pulp Paper Mag. Can. 51, no. 7: 148, 150, 152-5 (June, 1950).

To clarify the present status of spruce budworm control, the correspondence between the chief forester of the Brompton Pulp & Paper Co. Ltd. and the Officer-in-charge of the Forest Entomological Laboratory at Sault Ste. Marie, Ont., on the subject is published. E.S.

INSTRUMENTATION

ANON. Leeds & Northrup—instruments for the paper industry. Paper Trade J. 131, no. 4: 18-22 (July 27, 1950).

A brief history of the Leeds & Northrup Co., manufacturers of electrical measuring and automatic control instruments, and their activities is presented. Special reference is made to the manufacture of instruments serving the paper industry in the fields of pH control, sulfur dioxide recording and control, electrical measurement of the speed of calenders and other rolls, and control and recording of significant process temperatures. 6 illustrations.

E.S.

IONS

COHEN, W. E., FARRANT, GWENNETH, and WATSON, A. J. The influence of electrolytes on pulp and paper properties. I. Cation effects. Australian Pulp & Paper Ind., Tech. Assoc., Proc. 3: 72-101; discussion: 102-4 (December, 1949).

The results of a systematic study of the influence of cations on pulp and paper properties are discussed. Preliminary investigations showed that washing pulp to remove salts carried by it from the pulp mill significantly influenced the properties of paper made from the unbeaten pulp and also the pulp's response to beating in the Lampén mill. The effect of a dilute acid wash is greater than that of a water wash. Water-washed pulps and acid-washed pulps are equally sensitive to cation effects. The results presented demonstrate that the physical properties of paper are influenced by the presence of electrolytes in the process water; that the effect increases, within limits, with the concentration of the cation and varies, with some exceptions, with the valency of the cation. Some properties are more sensitive than are others. Freeness and air resistance are the most sensitive, these being affected by all cations. Bursting and tensile strengths are sensitive to most cations, whereas bulk and internal tearing resistance are the least sensitive, these being affected only when the process water contains hydrogen ion or polyvalent cations. Drainage time is also sensitive, the effect increasing with the concentration and with the valency of the cation. This sensitivity to cations is not specific to eucalypt pulps. Long-fibered kraft and sulfite pulps are affected in a similar manner. With those cations which lead to decreased strength properties, the greatest effect is caused by retardation of beating; with those which lead to increased strength properties, beating is accelerated. Some practical consequences of this are indicated. An attempt is made to reconcile cation effects with the existing knowledge of the electrokinetic potentials of cellulose. Some practical aspects arising from electrolyte effects, and related to pulp evaluation and paper manufacture, are outlined. 8 tables, 6 figures, and 16 references.

E.S.

JUTE

MUKHERJEE, R. R., and WOODS, H. J. Mercerization of jute. Nature 165, no. 4203: 818-19 (May 20, 1950).

The complete transformation of crystalline native cellulose into the hydrate modification by the action of caustic soda solutions is impossible in raw jute; this is attributed to partial reversibility of the reaction, rather than reaction of only part of the cellulose, as in the case of ramie. This difference in behavior is ascribed to the effect of lignin in jute, where it perhaps forms cross linkages between the cellulose chains near the boundaries of the crystallites and introduces an element of stability. Mention is made of an abnormal effect when jute is treated with a 10% caustic soda solution: an x-ray photograph indicates either a distortion of the sodium cellulose lattice or

the coexistence of a range of transitional state between native cellulose and sodium cellulose-I. 2 references. J. A. B.

LABORATORIES

ANON. New service—Paper and Pulp Testing Laboratories. Paper Trade J. 131, no. 2: 37-8 (July 13, 1950).

The Paper and Pulp Testing Laboratories were established to provide testing and consulting services to the paper industry and its consumers and suppliers. The Laboratories have been approved by the Certified Pulp Testers Bureau, and all tests are made according to TAPPI specifications. All physical tests are performed in an air-conditioned room which is maintained at 50% R.H. and 73° F. Some typical projects are described. 4 illustrations. J.A.B.

ANON. Provincial Paper's new lab. Can. Pulp Paper Ind. 3, no. 7: 12-13 (July, 1950).

A brief illustrated description of the new laboratory equipment of Provincial Paper Limited, Georgetown, Ont., is given, with particular reference to two pilot-plant models of the company's coating machines. Pilot plant no.1 duplicates the mill's air-brush coating machine, and pilot plant no. 2 is a scale model of the Thriftcoat machine at the Port Arthur mill. 6 illustrations. E.S.

LAWS AND LEGISLATION

PARKER, LEO T. The new Fair Labor Standards Act. Fibre Containers 35, no. 7: 88-91 (July, 1950).

The author discusses the exact legal rights and liabilities of employers under the amended Fair Labor Standards Act which became effective January 25, 1950. E.S.

LESPEDEZA SERICEA

BARKER, M. E. Sericea as a source of paper. Paper Trade J. 131, no. 4: 22, 24-6 (July 27, 1950); *cf.* B.I.P.C. 20: 319.

The growth of *Lespedeza sericea* and *Lespedeza bicolor* as long-term crops for soil enrichment and the stoppage of soil erosion is described. The plant grows each year from roots which send up vigorous shoots for at least 15 years. After the second year the dry stalks can be harvested; these are nearly fire resistant and contain an oil that repels water. Dry stalks remain unrotted in the field for two years or more. The stalks would cost the papermaker about $15.00 per ton dry weight to make the crop a paying one for the farmer. A pulp yield of nearly 50% may be expected. Some preliminary data on experimental papermaking at the University of Arkansas are given. Semichemical pulping, soda, sulfate, and sulfite cooks were tried through a rather wide range of temperatures, pressures, times, and concentrations of cooking liquor. A modified sulfate cook gave a satisfactory yield of nearly 50% pulp on the dry weight of the stalks. The pulp must be well beaten for papermaking, and the unsized paper is soft and smooth to the touch. Bleached pulps are suitable as part of the paper furnish or for dissolving pulps. 4 illustrations and 9 references. E.S.

LIGNIN

ARIES, ROBERT S. Research on lignin as a soil builder. Northeastern Wood Utilization Council, Bull. no. 32: 45-53 (June, 1950); *cf.* B.I.P.C. 16: 183.

This is an extended and brought-up-to-date treatment of the subject, with reference to successful experiments at Seabrooks Farms, Bridgeton, N.J. 2 tables. E.S.

BAILEY, A. Chromatographic behavior of lignins. Paper Ind. 32, no. 4: 395-8 (July, 1950); *cf.* B.I.P.C. 19: 701.

Lignin was extracted for one hour from aspen, birch, white oak, balsam fir, white spruce, and jack pine by means of aqueous butanol (50% by volume) at 160° C. The filtered liquors were precipitated with aqueous hydrochloric acid, and the washed air-dried lignin dissolved in 4% dioxane solution, which was applied slowly to the center of a filter paper and, after absorption, butyl acetate was applied as a solvent. The course of preferential lignin absorption was followed alternately in ultraviolet and visible light, and the appearances of the various zones were noted both wet and dry. Heterogeneity was found in all cases, and each chromatographic pattern appeared to be a specific function of the botanical source of the lignin. Figures showing various chromatograms (in some instances mixed chromatograms of the corresponding zones of the lignins of two genera) are given and discussed fully, and a redefinition of lignin is suggested. 1 table, 8 figures, and 2 references. L.E.W.

DUNN, STUART, SEIBERLICH, J., and EPPELSHEIMER, D. S. The use of lignin in potato fertilizer. Northeastern Wood Utilization Council, Bull. no. 32: 41-4 (June, 1950); *cf.* B.I.P.C. 16: 183-4.

This is a reprint of the article originally published in Bull. no. 7 of the Council; the discussion, however, is omitted. E.S.

LINDGREN, BENGT O. Attempts to synthesize α-(3, 4-dimethoxyphenyl)-glycerol derivatives. Acta Chem. Scand. 4, no. 4: 641-9 (1950). [In English]

Because substituted α-phenylglycerol derivatives (I) have been used by Freudenberg (*cf.* Fortschr. Chem. org. Naturstoffe 2: 1-26 [1939]) as models for lignin building stones, the following (I) have been synthesized: 2,3-dibromo-1-(3,4-dimethoxyphenyl)-1-propanone, 3-acetoxy-2-bromo-1-(3,4-dimethoxyphenyl)-1-propanone, 2-bromo-1-(3,4-dimethoxyphenyl)-2-propene-1-one, and 2-hydroxy-2-ethoxy-1-(3,4-dimethoxyphenyl)-1-ethanone. 1-(3,4-dimethoxyphenyl)-1,2-propanedione (II) (*cf.* Hibbert and co-workers, B.I.P.C. 14: 170) and 1-(3,4-dimethoxyphenyl)-1,2-ethanedione have been converted into the corresponding quinoxaline derivatives. Attempts to synthesize 2,3-dihydroxy-1-(3,4-dimethoxyphenyl)-1-propanone derivatives failed. Hydrolysis of 2-bromo-1-(3,4-dimethoxyphenyl)-2-propene-1-one readily gives (II). 1 table, 2 figures, and 17 references. F.E.B.

RICHTZENHAIN, H. The constitution of spruce lignin. Acta Chem. Scand. 4, no. 4: 589-96 (1950). [In German] *cf.* B.I.P.C. 20: 791.

The decomposition of methylated hydrochloric acid spruce lignin with potassium permanganate according to Freudenberg and co-workers (*cf.* B.I.P.C. 9: 67) also gives iso- and meta-hemipinic acid, in addition to veratric acid. This indicates that hydrochloric acid lignin contains guaiacylpropane structural-group building stones condensed at the C atom-6 of the benzene ring, in addition to uncondensed building stones and to those condensed at the C atom-5. It further shows that the phenolic hydroxyl groups are distributed over three different types of building stones. The reaction of

lignin with bisulfite, thioglycolic acid, and alcoholic hydrochloric acid does not primarily involve the scission of cyclic ether groups. 23 references.
F.E.B.

LIME AND LIMESTONE

GIBBS, RALPH E. Engineering management in the lime-recovery plant. Paper Trade J. 131, no. 2: 30, 32, 34-5 (July 13, 1950); *cf.* B.I.P.C. 20: 643.

In order to make the lime-recovery kiln as economically productive as possible, not only process control, but engineering management as well, is essential. It is suggested that, if possible, an engineering manager be employed to follow closely the operation of the kilns and their auxiliary equipment and make recommendations for improvements. Often minor down-time periods add up to tremendous losses, and it is the duty of engineering management to discover the causes and eliminate them. An operating log of the lime-recovery plant, stating the length of each interruption and its apparent cause, will indicate when and where investigations are necessary. 1 table.
J.A.B.

LUBRICATION AND LUBRICANTS

HALL, R. W., and LANGWORTHY, M. L. High-lighting drier bearing lubrication. Southern Pulp Paper Manuf. 13, no. 7: 49-51 (July, 1950); Paper Trade J. 131, no. 1: 15-18 (July 6, 1950); Paper Mill News 73, no. 33: 51-2, 54, 56 (Aug. 19, 1950).

The authors describe the development of oils with the necessary dispersive and detergent additives for lubricating paper-machine drier-roll bearings operating at higher temperatures and pressures. Before their use bearing failures were numerous in many plants which employed straight oils (which were satisfactory at lower temperatures) at high steam temperatures and operating speeds. With additive-type oils, on the other hand, no corrosion, rusting, or pitting will occur; dirty bearings will clean up and stay clean, and a protective oil film will be formed on all surfaces, so that down time for inspection and cleaning are noticeably reduced. However, since these oils will carry contaminants in suspension back to the settler and filter, it is imperative that these units function efficiently at all times. The tests on paper mill lubricants used in this development and their results are described. 2 tables and 9 figures.
E.S.

MACHINERY

THE SANDY HILL IRON & BRASS WORKS. Advancement in engineering design at Sandy Hill. Paper Mill News 73, no. 28: 64, 66 (July 15, 1950); *cf.* B.I.P.C. 19: 243.

Reference is made to recent developments in engineering design (the flow control unit with recirculation and double Neilson slice, the Sandy Hill selective drive, the new high-speed Fourdrinier machine), materials of construction (Ductile cast iron produced under license from International Nickel Co.), and new processes (the new molded corrugated sheet Peripac [*cf.* B.I.P.C. 20: 234] and the OCO water system [*cf.* B.I.P.C. 20: 912]). Through an arrangement with Kamyr, the company is able to offer the famous Scandinavian pulp bleaching process by Kamyr (*cf.* B.I.P.C. 20: 548). 4 illustrations.
E.S.

MACHINERY—CALENDERS

RILEY, R. Super calender operation and equipment. Paper Mill News 73, no. 28: 46-7 (July 15, 1950).

The author describes the three Beloit supercalenders installed by Crown

Zellerbach in their West Linn, Ore. mill, for supercalendering either machine-coated or uncoated grades of printing papers. Each unit has 10 rolls, five water-cooled iron and five filled rolls. Two filled rolls are run together near the center of the stack, thereby reversing the sides of the sheet contacting the metal polishing rolls; in this manner, both sides of the sheet are polished in one pass through the machine. Only the top and bottom metal rolls are provided with doctors; the sheet passes around fly rolls between each nip, and four steam showers are used, two on each side of the sheet. The anti-friction bearings on all three supercalenders are lubricated by a common Bowser system and are stopped automatically in the event of a lubricating-oil pressure failure. Control equipment is mentioned briefly. E.S.

SHERMAN, DALE. Phases of wide roll high speed supercalendering. Paper Mill News 73, no. 29: 14 (July 22, 1950).

Supercalendered paper can be no better than the paper made on the machine; all good and undesirable qualities are emphasized by the calendering process. Two very important factors for good results are moisture content and evenness of weight across the sheet. At the author's mill at Deferiet, a Glens Falls laboratory glossmeter is mounted on each supercalender, which gives a finish reading on both sides of the sheet, after calendering. The instrument is of great help in keeping the finish uniform. Connected to the glossmeter is a Bailey recorder with a dial chart which is changed every 24 hours; it records how the finish averages, as well as the down time. The supercalenders are run at speeds up to 1700 ft./min. No. 3 Filmat fillings have been found most satisfactory in this particular mill. Two steam showers are used on each side of the paper and are operated fairly high on the calender, so that the web has to pass several nips after receiving the steam on the surface of the sheet. The use of large supercalenders to take full reels from the paper machine effects a cost reduction because of greater production. E.S.

MACHINERY—CHIPPERS

FENTON, R. H. A pilot study of the use of light portable wood chippers. Pulp Paper Mag. Can. 51, no. 7: 132-3, 136 (June, 1950).

The author discusses the possibilities of light portable wood chippers for converting brush and small trees (a valueless material) into a form that has extensive potential usage, not only in the pulp and paper field, but also in other types of use. The main purpose of the study was the determination of the cost of preparing the raw material, the productive capacity of the chipper, the chipping costs, and the cost of the chips delivered into trucks. It was found that about 12 tons daily can be chipped with such a portable unit and that the chipping costs are close to $2.00 per ton. The total cost in trucks ranged from $3.86 to $5.94 per ton, depending on the cost of preparing the raw material. E.S.

MACHINERY—CONVERTING MACHINERY

SAMUEL M. LANGSTON COMPANY, *Camden, N.J.* New large spiral tube winder. Fibre Containers 35, no. 7: 72 (July, 1950).

Brief reference is made to a new tube winder for heavy and large tubes, as used for packaging chemicals, carpets, and rugs, and for making concrete forms, barrels, and drums, and for similar purposes, where large tubes with heavy walls are required. 2 illustrations. E.S.

MACHINERY—DIFFUSERS

FRÖHLICH, E. A continuous diffuser for use in the sulfate, sul-

fite, starch, sugar, fat, and oil industries. Das Papier 4, no. 11: 202-5 (June, 1950). [In German]

The construction of the continuous diffuser is described with appropriate sketches. Its advantages, e.g., savings in iron, steel, building materials, and floor space, are stressed. A few experiments with straw and wood pulps are described briefly. 1 table and 4 diagrams. L.E.W.

MACHINERY—DRIVE

GAHL, E. A. New developments in paper machine drives. Paper Mill News 73, no. 28: 58-9, 62 (July 15, 1950); *cf.* B.I.P.C. 20: 569.

The advantages of Vari-pitch V-belt drives for the different sections of the paper machine, rewinders, calenders, screens, pumps, and paper cutters are outlined. 7 illustrations. E.S.

MACHINERY—FELTS

BURDSALL, JOHN E. Tissue machine clothing. Paper Mill News 73, no. 28: 50, 91 (July 15, 1950); Paper Trade J. 131, no. 1: 24, 26 (July 6, 1950).

Useful directions for the operation of tissue-machine felts and cylinder and Fourdrinier wires are given. The life of felts and wires is a cost and not a quality problem. Quality is maintained by putting on new wires and felts when needed; the cost is the record of the ability of the operator to cope with the problem. E.S.

MACHINERY—HOODS

CHAPMAN, J. The operation of an air recirculation system for M. G. hood drying. Pulp Paper Mag. Can. 51, no. 7: 102-6 (June, 1950).

The design and operation of the Spooner M.G. drying hood are described. Some results on the effect on drying rate of air velocity, temperature, and humidity are given for fiberboard dryers, operating on exactly the same principle as the M.G. drying hood. The author has found that the Spooner hood operating under the conditions described gives a 20% increase in capacity compared with a simple hood circulating low-velocity warm air. It is considered that the capacity could be still further increased by using as high a steam pressure as possible and maximum air and vapor recirculation by closing the air ports and reducing the quantity of moist air exhausted from the hood. 3 tables, 11 figures, and 1 reference. E.S.

MACHINERY—PAPER MACHINE

MOORE, H. C. Paper making developments and trends since the war. Paper Mill News 73, no. 28: 38-40, 80 (July 15, 1950); Paper Trade J. 131, no. 1: 20-2, 24 (July 6, 1950).

In American papermaking, a continuous battle is waged between quality and production, because it is considered unnecessary to make a product better than the market demands or requires, to the detriment of production. This has led to the specialization of paper machines to make certain grades and weights with marked improvements in quality and efficiency, in contrast to most European practice, where the necessity for frequent changes handicaps the realization of the advantages of standardization in many instances.

To analyze the progress made since the war, the bottlenecks in improving quality and production and the efforts to overcome them on both Fourdrinier and cylinder machines are reviewed. Those of a mechanical nature are neither serious nor insurmountable; the two most difficult problems are of a papermaking nature and involve (*a*) the forming of the sheet and (*b*) its handling at high speeds. Under (*a*) the hydraulic problems of stock flow onto the wire of Fourdrinier machines and onto the cylinder in board machines are discussed; under (*b*) open draws, particularly those between the couch and the first press, the effects of the drive, and the training of the operators are mentioned. Recent advances in the manufacture of tissue, kraft board and paper, book and printing paper, rag-content paper, and newsprint are listed, with emphasis on present and future speeds. In conclusion, the scientific approach to the economic reconstruction of existing machines or the installation of completely new units is discussed. E.S.

MACHINERY—PAPER MACHINE—EXPERIMENTAL

THE FRANKLIN INSTITUTE. Museum. J. Franklin Inst. 250, no. 1: 76 (July, 1950).

A brief reference is made to the model Fourdrinier machine in the museum of The Franklin Institute and to the interesting historical associations of Philadelphia with the paper industry. E.S.

MACHINERY—PUMPS

ROBERTSON, R. J. The correct selection of centrifugal pumps. Australian Pulp & Paper Ind., Tech. Assoc., Proc. 3: 144-69; discussion: 170-8 (December, 1949).

The wide use of centrifugal pumps in the paper industry demands that their characteristics and principles be understood by the practical user as well as the design engineer. The author outlines the elementary principles of pumping and attempts to demonstrate the possibilities and limitations of the centrifugal pump. Particular attention is given to the selection of pumps for most efficient operation and, as a guide to the pump user, a series of problems and their solutions is presented as an appendix. 3 tables and 23 diagrams. E.S.

MACHINERY—SCREENS

FERGUSON, R. R. The performance of Cowan screens on western groundwood. Pulp Paper Mag. Can. 51, no. 7: 118-20 (June, 1950).

For several years, increased production demands and higher quality requirements on the paper machines had overtaxed the groundwood screenroom at Ocean Falls. To alleviate this condition, it was necessary to modernize the process. As the former screens could not be rehabilitated economically, new Cowan screens were installed to maintain quality and production. A report on their operation, maintenance, and power requirements is given. The many advantages of Cowan screen operation are offset to a small degree by the increased dirt count of the accepted stock. 2 tables. E.S.

HEWITT-ROBINS, INCORPORATED. *Robins Conveyor Division, Passaic, N.J.* New screening equipment. Paper Mill News 73, no 30: 16 (July 29, 1950).

Brief reference is made to the use of the Vibrex screen for handling wood chips and of the Eliptex Dewaterizer as a knotter. 2 figures. E.S.

MATERIALS HANDLING

SHIPP, C. F. Power trucks in industry. World's Paper Trade Rev. 133, no. 25: 1748, 1750, 1752 (June 22, 1950).

The benefits of lower cost and higher productivity are illustrated, which are to be derived from efficient materials-handling systems, such as the different types of power trucks. E.S.

METERS AND RECORDERS

ANDERSSON, OLLE. The differential tachometer; an instrument for measuring small differences in speed. Svensk Papperstidn. 53, no. 11: 306 (June 15, 1950). [In Swedish; English summary]

A brief illustrated description is given of an instrument which was constructed at the Swedish Forest Products Laboratory for the direct measurement of differences in peripheral speed. It consists of two selsyn motors used as tachometers and electronic equipment for transferring the signals to a counter. A 50-cycle per second signal is modulated by the angular difference of the selsyns, detected, amplified, and fed to a counter, giving the difference in the number of revolutions of the tachometer shafts. An electronic stop watch can be connected with the counter to give the difference in speed in centimeters per minute. 2 figures. E.S.

MILL MANAGEMENT

ANDERSON, A. S. The part played by a superintendent in personnel relations. Paper Mill News 73, no. 30: 14-15 (July 29, 1950).

The author stresses the human element in industrial relations in the generally accepted areas of a superintendent's or foreman's activities: employment, safety, wages and benefits, leisure-time activities, and training and development, with particular emphasis on the last of these. E.S.

HAMLIN, STEPHEN C. Maintenance work load. Paper Ind. 32, no. 4: 399-400 (July, 1950); *cf.* B.I.P.C. 20: 796-7.

The author discusses the basic requisites for maintenance planning and shows how the load charts used for production planning and control can be adapted to maintenance work. 2 charts. E.S.

MOORE, JAMES D. Rate your employees fairly! Shears 68, no. 691: 33-4, 36 (July, 1950); *cf.* B.I.P.C. 20: 796.

Merit rating or service rating is the process of evaluating employees' performances in terms of requirements of the job. Such a rating system assures uniform and systematic judgments by supervisors, provides information on which to base promotions and employee selection, inspires greater effort among employees, and aids in supervisory development. The essential factors to be included in an efficient rating program are: quality of work, value of work, knowledge of work, initiative, work attitude, and attitude toward others. A sample form is illustrated. J.A.B.

MOORE, W. CLEMENT. Continuous capable executive control pays dividends. Shears 68, no. 691: 15, 74 (July, 1950).

Suggestions are made for increasing profits by cutting down on overhead; keeping equipment up-to-date; adopting wage incentive, cost, and production

control systems; and insisting on weekly executive reports. Two graphs show the comparative performances of two paper box manufacturers. J.A.B.

STEVENS, ROBLEY, D. Easy record-keeping check list. Fibre Containers 35, no. 7: 92-3 (July, 1950).

A check list is presented for providing accurate and adequate record-keeping practices with regard to problems of wage administration. E.S.

TURNER, G. G. Preventive maintenance in the pulp and paper industry. Australian Pulp & Paper Ind., Tech. Assoc., Proc. 3: 179-95; discussion: 196-8 (December, 1949).

The author describes a system developed at the Burnie mill of the Associated Pulp and Paper Mills Limited, including the organization of the maintenance staff, the development of a record system, control, lubrication, spare parts, and a new filing system. 2 tables and 8 figures. E.S.

WELLERSHAUS, ADOLF. Management, organization, and statistics. Allg. Papier-Rundschau no. 11: 547-52 (June 15, 1950). [In German]

The author discusses the managerial functions in the four fields of purchasing, manufacturing, administration, and sales, means and expedients for an efficient organization, and the value of statistics in comparisons and cost accounting. E.S.

MOLDS

APPLING, JOHN W., BUCKMAN, STANLEY J., and CASH, CONAN D. Some further observations on *Penicillium roqueforti* Thom. Tappi 33, no. 7: 346-9 (July, 1950).

An unusually interesting case of inhibition of mold growth under laboratory conditions was noted in groundwood pulp treated with different amounts of a 10% solution of phenylmercuric acetate. Pulp specimens given the lowest treatment were essentially free of mold growth when incubated in Mason jars, whereas mold growth occurred to an appreciable extent on pulp specimens given three higher treatments with the same toxicant. Antibiosis was suspected as the explanation for the inhibition of mold growth on the pulp given the lowest treatment. The antagonistic organisms were believed to have been inhibited by the higher concentrations of toxicant, thus allowing the mold to grow. The mold present was primarily *Penicillium roqueforti*, and the authors had previously demonstrated the high resistance of this organism to phenylmercuric acetate. Isolations from the pulp given the lowest amount of treatment confirmed the presence of a rod-shaped, chromogenic, Gram-negative, nonspore-forming bacterium which showed marked antagonism toward *Penicillium roqueforti* under various conditions of growth, such as in malt agar medium and in groundwood pulp to which maltose and sodium nitrate had been added. As previously reported by the authors, limited growth of *Penicillium roqueforti* apparently does not appreciably affect the usefulness of groundwood pulp. However, this mold organism seems to be widely distributed, and the observed results thus add to the increasing amount of information available on biological competition between members of the microflora of pulp and paper mills. 4 figures and 6 references. E.S.

BARAIL, LOUIS C. Preparation and testing of mold-resistant wrapping papers. Tappi 33, no. 7: 349-52 (July, 1950).

A great number of fungicides can be incorporated in pulp and paper. They are of various types: some are water soluble, some are soluble in organic solvents only, and others are of the plastic type. The method of impregnation varies according to the chemical and physical characteristics of the agents. Some are more suitable for the incorporation in pulp, whereas others give best results when applied to the finished paper; the latter can be processed by dipping, soaking, spraying, painting, or laminating. Fungistatic and fungicidal tests are described, as well as toxicity, skin irritation, taste, and odor tests. Finally, the fungicides used in the treatment of wrappers should not change the normal color or texture of the paper, nor be susceptible to chemical changes caused by oxidation and the action of light, heat, or cold which, in turn, might affect the normal color, feel, or appearance of the wrapper. Out of more than 400 compounds which were tested for comparative germicidal and fungicidal efficiency, very few were found to meet all the necessary requirements. Chlorine derivatives are very efficient when incorporated into pulp. When there is no objection to odor, pentachlorophenol and sodium pentachlorophenate can be recommended. When there is no objection to color, copper compounds give satisfactory results. However both groups are relatively toxic. The best results are definitely obtained with long-chain mercurials which have lasting qualities (which no other compounds possess), in addition to being nontoxic and nonirritating at normal concentrations of use. E.S.

SKINNER MACHINERY COMPANY, INC., *Dunedin, Fla.* Gas to protect packaged fruit. Fibre Containers 35, no. 7: 86 (July, 1950).

Brief reference is made to Skinner Sound Delivery Gas (claimed to be nontoxic and noncorrosive) which provides positive control of blue-green mold and stem rot to gassed citrus fruits in containers, without icing of the cars. The gas treatment also accelerates the degreening process. Recently a system has been developed whereby the floor of the car is treated with the gas substance so that the fruit in the containers is protected during shipment. The cost of the process is about one tenth that of refrigeration; in addition, a large part of the loss on citrus fruit, which is stated to be normally as high as 25-30% of the fresh fruit shipped, is saved. E.S.

NEWSPRINT

BOWATER, ERIC. Newsprint review. Pulp Paper Mag. Can. 51, no. 7: 88-90 (June, 1950).

The newsprint supply and demand throughout the world and the effects of the devaluation of the pound sterling and the Canadian dollar on the Canadian newsprint industry are reviewed. E.S.

NOMOGRAPHIC CHARTS

RHODES, R. C., and DAVIS, D. S. Temperature correction nomograph for sulphite freeness. Paper Ind. 32, no. 4: 398 (July, 1950).

Since freeness tests are not always made at the standard or reference temperature, a nomograph is presented which permits a convenient correction to 25° C. in the case of the Williams precision freeness tester operating on sulfite pulp. 1 diagram and 3 references. E.S.

OAK

HARVIN, R. L., HILLS, G. B., JR., ROTHROCK, C. W., JR., and NOLAN, W. J. Pulping of scrub oak (*Quercus laevis*) by the kraft process. Tappi 33, no. 7: 338-43 (July, 1950).

Turkey oak (*Quercus laevis*) has been investigated as a source of filler pulp for white papers. Pulping conditions studied were combinations of 12, 14, and 16% chemical; 20, 35, and 50 g./l. liquor concentration; 100 and 115 p.s.i. cooking pressure, all at a sulfidity of 25%. The strength characteristics and bleachability of representative samples have been determined. The data show that the optimum conditions for producing a pulp requiring 8 to 10% available chlorine are 14 to 16% chemical; 20 to 35 g./l. liquor concentration; 115 p.s.i. cooking pressure; 3 to 3½ hours total cooking time, 1 hour to final temperature. These pulping conditions produce a pulp from turkey oak comparable to other short-fibered bleached pulps used commercially. 2 tables, 5 figures, and 3 references. E.S.

PACKAGING

ANON. Half-pound butter. Modern Packaging 23, no. 11: 132-3 (July, 1950).

In order to meet the demand for smaller units of sale, Turner & Pease, Inc., a Seattle dairy firm, has introduced a half-pound butter package containing two quarter-pound prints separately wrapped in parchment, then combined in a flexible overwrap. This change in package size involved several changes in machinery, particularly in the sealing operation; the packaging procedure is described. 4 illustrations. J.A.B.

MODERN PACKAGING. Morton Salt. Modern Packaging 23, no. 11: 82-7, 203-5 (July, 1950).

In addition to being the largest producer of a vital commodity, the Morton Salt Co. claims the distinctions of being first to incorporate a moisture barrier in a paper package, first to offer the convenience of a hinged aluminum pouring spout, and of having one of the best promoted and most famous trademarks in the history of American packaged-goods merchandising. The history of the company and the evolution of the package with the girl-with-the-umbrella trademark are described in detail, and mention is made of the company's other packaged products. 10 illustrations. J.A.B.

PAPER—COATED

AREND, A. G. Developments in printing coated papers. Paper & Print 23, no. 2: 212, 215 (Summer, 1950).

As the production of coated papers returns to normal, tendencies toward better printing surfaces, brighter colors, greater strength, better receptivity, and higher press speeds are apparent. Methods have been found for making dull-coated paper more printable, and its popularity is increasing. Features of the different grades of coated paper are mentioned, and the coating process is described very briefly. Process-coated sheets produced from groundwood are discussed with respect to their weight and printability. J.A.B.

BROUGHTON, GEOFFREY, EGAN, LAWRENCE W., and STURKEN, ROBERT C. The reverse roll principle of coating. Tappi 33, no. 7: 314-17 (July, 1950).

The reverse roll method of coating is described, and its advantages mentioned. In the present study the coverages obtained on a 10-inch wide laboratory reverse roll coater were measured for a glue solution (Newtonian), a vinyl resin in organic solvent (Newtonian), a clay-casein coating color (plastic), a vinyl resin in organic solvent (pseudoplastic), and an aqueous dispersion of vinyl resin (thixotropic). The results are presented for

different casting roll-backing roll speed ratios, nip clearances, and operating speeds. In general, the wet thickness (t) applied to the web appears proportional to the metering roll clearance (D) and the casting roll-backing roll speed ratio (R), and is independent of web speed as long as this ratio remains constant. The coverage can be predicted with a fair degree of accuracy by the relation $t = kDR$ where k is a constant. For aqueous solutions with the particular metering roll-casting roll speed ratio used (0.33), k had a value of about 0.5. The value of k is affected significantly by the metering roll-casting roll speed ratio, increasing as this variable decreases. Below a certain critical value of R, in no case greater than one, the coating becomes nonuniform. 5 tables and 2 references. E.S.

COZENS, A. A. The coating of paper and board. Australian Pulp & Paper Ind., Tech. Assoc., Proc. 3: 322-32; discussion: 333-7 (December, 1949).

The author describes the coating of paper and board as a separate operation (off-machine coating) and during its manufacture on the paper or board machine (machine coating). 3 diagrams. E.S.

DAY, FREDERICK T. Paper converting. Paper & Print 23, no. 2: 226, 228-9 (Summer, 1950).

In a brief discussion of converting procedures, the author deals chiefly with coated papers. The two-sided off-machine coating process is outlined, as well as the more common method of applying the coating to one side at a time. J.A.B.

FRISCH, N. M., CUSHING, M. L., and GUSSMAN, L. The preparation of a water-resistant starch coating by the use of antimony salts. Tappi 33, no. 7: 328-32 (July, 1950).

A new method of insolubilizing starch-base paper-coating colors is discussed. An antimony salt, potassium pyroantimonate ($K_2H_2Sb_2O_7$) is blended with the regular components of a starch-clay coating color, applied on regular coating equipment, and dried at paper machine drying temperatures to produce a coated paper with good wet-rub properties. The theory of the chemistry of the reaction between starch and the antimony salts is discussed, and the best type of paper-coating starch for use with this process is indicated. Formulations for coating colors for high and low solids coating are given. The effect of pigments, plasticizers, drying-time, drying temperature, and pH on the antimony-starch reaction are discussed in some detail. The major advantage of the process over existing insolubilizing methods, the fact that pH adjustment is unnecessary, is brought out. The antimony-starch reaction is most effective in the 7.0 to 7.8 pH range, and that range coincides with maximum clay-color fluidities. Since most printing processes are most effective on coated paper with coatings in that pH range, this factor aids printing and ink drying. The insolubilizing effect is evident immediately after the coating and drying process. Drying time and drying temperature are the critical factors in the efficiency of the process and several charts are presented showing the wet rub of the coating in terms of drying temperature and time. The shelf life of the finished coating color is shown to be good, and chemicals for varying the viscosity over a wide range are discussed. The use of potassium pyroantimonate as an insolubilizing agent raises the Dennison wax test over the wax of the same color, without the antimony salt. Several forms of the antimony salt are available: dry, white powders, and stable, water-thin, straw-colored 40% solids solutions. Other uses of

the starch-antimony reaction are indicated, including the application for insulation and wallboard coating, particularly where fire-retardant coatings are desired. Other fields where experimental work is in progress are wet-strength papers, asbestos paper, and wallpaper. 3 tables, 4 figures, and 14 references. E.S.

SIMPSON, J. R. The Champion machine coating process in the United States and abroad. Southern Pulp Paper Manuf. 13, no. 7: 34, 36, 38 (July, 1950); *cf.* B.I.P.C. 19: 640-1.

An illustrated description of the Champion machine-coating process for paper and boxboard is given, which is similar in scope to the previous reference. There are now 32 Champion coater installations in operation in different board and paper mills in the United States and abroad, and 13 others are awaiting the delivery of equipment. 2 tables and 4 illustrations. E.S.

PAPER—CONVERSION

ANON. Appleford Paper Products opens new plant. Can. Pulp Paper Ind. 3, no. 7: 14-15 (July, 1950).

Brief reference is made to the new plant of Appleford Paper Products Ltd. at East Hamilton, Ont., one of Canada's leading paper converters, which manufactures a large volume of industrial and food-protective papers and bags; most of the base papers used in the conversion processes are purchased from the Kalamazoo Vegetable Parchment Co. at Espanola, Ont. 3 illustrations. E.S.

WIECZOREK, T. J. Osborn Paper Company profits from modern methods. Am. Paper Converter 24, no. 7: 7, 40-1 (July, 1950); Am. Boxmaker 39, no. 8: 32-3 (August, 1950).

A recent overhauling of production methods, wage policies, cost control, and price schedules has made the Osborn Paper Co. of Marion, Ind., one of the most efficient paper converters in the industry. The new incentive pay system and labor-saving improvements made in the plant layout are described. J.A.B.

PAPER—CURLING

ERSPAMER, AUGUST S., and RICE, WILLIAM D. The problem of curl. Paper Mill News 73, no. 28: 76-8, 88 (July 15, 1950).

The authors discuss the different forms of curl (moisture curl, inherent curl, and structural curl), their causes, the way in which they manifest themselves, and methods of correction or, preferably, prevention. The use of various external devices for moisture addition or conditioning seems to receive increasing interest and consideration. Such equipment should be viewed as a last resort, because it is far more desirable to retain moisture than to replace it. 6 figures and 8 references. E.S.

PAPER—DEFECTS

ST. JOHN, EUGENE. Points to remember about grain of paper. Inland Printer 125, no. 4: 48 (July, 1950).

The importance of printing the pages of a book with the grain vertical is emphasized; thus the leaves curve readily when the book is opened, without strain at the extreme back edge. A book should never be printed with some of the pages having the grain vertical and some horizontal, for paper

stretches more across than with the grain. The two-sidedness of paper and the importance of uniform caliper in book paper are mentioned briefly.
J.A.B.

PAPER AND PULP INDUSTRY

BOARD OF TRADE JOURNAL. Paper production and supplies; a survey for the year 1949. World's Paper Trade Rev. 133, no. 20: 1392, 1394, 1396 (May 18, 1950).

Facts and figures concerning the production and supplies of paper and board in the United Kingdom during 1949 are given. Although notable improvements in the production of paper were made, the 1949 total was still 23% below the prewar average; newsprint accounted for the major part of this deficiency. The total production of board, on the other hand, was 15% higher than immediately before the war. E.S.

FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS. Wood pulp. Unasylva 4, no. 2: 69-77 (April-June, 1950).

In 1948 wood pulp consumption in North America attained new record heights, and consumption by European mills, although still below normal levels, was rapidly increasing. A recession occurred in the U. S. in the summer of 1949, but by 1950, a rapid restoration of equilibrium was apparent. There has been a decided price decline on the pulp market since the fall of 1948, but an approximate supply-demand balance by the end of 1949 led to greater stabilization. The trends in the wood pulp industry are discussed with regard to production, trade, prices, and consumption, and each of the major countries is considered separately. The world paper trade is also being restored to normal, although effective demand still slightly exceeds supply. Production, distribution, and consumption figures are given for newsprint, which accounts for about 28% of the world's consumption of wood pulp. Statistical data are summarized in 6 tables and 2 graphs. J.A.B.

PULP & PAPER. 1950 North American review number. Pulp & Paper 24, no. 5: entire issue (April 30, 1950); *cf.* B.I.P.C. 19: 709.

The 1950 annual review of the North American pulp and paper industry includes the following sections, listed by title and subtitle: Review of fifty years—and the next half century? p. 59-62; Worldwide industry status—ECA developments and tariff reduction, p. 63-4; The paper section; market is being sustained (Paper in the South, p. 66, 68; Paper in Middle West, p. 68-70; Paper on Pacific Coast, p. 70-3; Paper in Northeast, p. 73-4; Paper in East Canada, p. 74, 77; Expansion in conversion of paper on West Coast, p. 77); The board section; fiberboards and paperboards (Board in Northeast, p. 78-9; Board in Middle West, p. 79-80; Board in South, p. 80-1; Board on Pacific Coast, p. 81; Board in East Canada, p. 82, 84); Wood pulp section; future outlook is favorable (Pulp on the Pacific Coast, p. 86, 88, 90, 92; Pulp in the South, p. 92, 95; Pulp in Northeast, p. 95, 97-8, 100; Pulp in the Middle West, p. 100, 102; Pulp in East Canada, p. 102, 104, 106; U. S. pulp statistics, p. 106, 108); Pulpwood section; new equipment developed (Pulpwood in Midwest, p. 110-11; Pulpwood in Northeast, p. 112, 114; Pulpwood in South, p. 114, 116; Pulpwood—Pacific Coast, p. 116, 118, 120, 122; Pulpwood in East Canada, p. 122, 124, 126); Newsprint section; healthier situation exists (Newsprint in East Canada, p. 128-30; Newsprint on Pacific Coast, p. 130, 132; Newsprint in Northeast, p. 132, 134; Newsprint in South, p. 134, 136; Newsprint in Middle West, p. 136, 138); Labor relations—wage agreements; employe benefits (Labor in Northeast, p. 140; Labor on Pacific Coast, p. 140, 142; Labor in Midwest, p. 142, 144; Labor in East

Canada, p. 144); and Non-paper cellulose—rayon, cellophane, plastics, etc., p. 148, 150, 152, 154, 156, 164. Pertinent statistical data, tables, and charts are included in most of the articles. J.A.B.

SCHEYE, KLAUS G. Analysis of pulp and paper industry and the raw material supply. Paper Trade J. 130, no. 7: 33-8; no. 11: 17-20; no. 14: 23-4, 26; no. 17: 23-4, 26-7; no. 22: 12, 14, 16-18 (Feb. 16, March 16, April 6, 27, June 1, 1950); 131, no. 3: 36, 38, 40, 42 (July 20, 1950).

This report deals with the effects of the shortage of raw materials on the North American pulp and paper industry. It is divided into three parts. Part I is a summary of the raw-materials situation in Canada and the United States, with brief reference to the world pulp situation. Part II deals with the consequences to the industry of the shortage of raw materials (newsprint industry, the move to the South, regional developments in other areas, and concentration as a result of expansion movement). The questions of geographical location, integration, and size of the individual enterprises are discussed in some detail. Part III deals chiefly with the future of the industry, with a brief reference to some technical developments which may be taken as indications of future trends. The subject is discussed in two sections: reduction of waste in forest operations through close integration of wood-using industries, and fuller utilization of the raw material by improved processing methods and increased use of by-products. The present study indicates that the raw-material situation is sufficiently dangerous to make a long delay impossible. 33 tables, 20 illustrations, and 89 references. E.S.

SMITH, VINCENT S. Paper famine. Brit. Printer 63, no. 373: 49 (July-August, 1950).

In view of the increased demand for paper which has resulted from the steady rise in population and the increasing literacy in backward areas, world production is far short of the potential world consumption. Statistics are presented to illustrate this fact. J.A.B.

WALLENBERG, MARCUS. Sweden's present economical position. Svensk Papperstidn. 53, no. 9: 227-30 (May 15, 1950). [In Swedish]

The author discusses the postwar changes in foreign trade and the economical structure of the country. E.S.

PAPER AND PULP INDUSTRY—EDUCATION

FIRRELL, J. P. Education and training in the paper trade. World's Paper Trade Rev. 133, no. 25: 1777-84, 1789 (June 22, 1950); Paper-Maker (London) 119: 5-13, 25 (Mid-summer, 1950).

The author discusses various aspects of the subject, such as the negative attitude of some British employees (including examples of typical responses) and means for arousing their interest, training for the sales force and the converting department, the City and Guilds examinations, the organization of a course of study, the importance of the instructor and suggestions for improving the participation in the discussions of the Technical Section meetings. 3 references. E.S.

HALL, PATRICIA. Discussing training courses for potential foremen and foremen's refresher courses; general considerations and

experiences of interest to the paper making, printing and allied industries. World's Paper Trade Rev. 133, no. 25: 1789-98 (June 22, 1950); *cf.* B.I.P.C. 19: 176.

Following a brief discussion of the part played by the foreman in management and the functions of foremen, the author outlines the details of a training course for potential foremen in the papermaking industry and three refresher courses for foremen and supervisors from (*a*) the papermaking industry, (*b*) the printing industry, and (*c*) the industry in general. In conclusion, the value and justification of such courses is outlined. 1 reference. E.S.

RENARD, J. Apprenticeship in papermaking. Papeterie 72, no. 6: 301, 303 (June, 1950). [In French]

The apprenticeship system in the French paper industry is discussed, and the need for modernization is emphasized; suggestions for improvements are given to bring it in line with current technical developments. E.S.

PAPER AND PULP INDUSTRY—TRANSPORTATION

PHIPPS, W. J. Warehousing. Australian Pulp & Paper Ind., Tech. Assoc., Proc. 3: 361-8; discussion: 368-73 (December, 1949); Paper-Maker (London) 70, no. 2: 97, 99-100, 102, 114 (August, 1950).

The problems associated with packing and shipping of paper are discussed and the line system used at the Associated Pulp and Paper Mills Ltd. for packing bales is described. The output and space requirements for this and the independent group method of packing are compared. The methods used for packing and protection of reels against damage and moisture regain are outlined, together with some recommendations concerning the further development of this section of mill operations. The fact that more attention should be paid to the protection of a carefully manufactured product during transport is emphasized. 2 figures. E.S.

PAPER AND PULP MILLS

ANON. Calcasieu Paper Company expansion program completed. Paper Mill News 73, no. 28: 30-1 (July 15, 1950).

A brief description of the expansion program of the Calcasieu Paper Co., Elizabeth, La. is given. A new Pusey & Jones Fourdrinier paper machine with a modern hood and ventilating system will produce approximately 200 tons of kraft wrapping, butchers, and bag paper per day. A new modern bag-converting plant was also erected on the mill site. 6 illustrations. E.S.

PULP & PAPER. N.Y. & Penn's story; coated paper mill expands. Pulp & Paper 24, no. 8: 30, 32, 34, 36 (July, 1950).

An illustrated description of the recent expansion of the Lock Haven, Pa. mills of the company is given. It involved the addition of a modern storage and pulp handling building with unusual equipment, a completely new pulp preparation system with two Hydrapulpers, a new coating materials-handling system, and a new Beloit machine with machine-coating unit. 16 illustrations. E.S.

RICHARDSON, S. Great Lakes completes extensive improvements. Pulp Paper Mag. Can. 51, no. 7: 76-85, 90 (June, 1950).

Following a brief history of the Great Lakes Paper Co., Ltd., the modernization program of the newsprint mill at Fort William, Ont. since 1946 is described; the improvements and additions to the sulfite, groundwood, and paper mills, the finishing department, woodroom, boiler house, the electrical, mechanical, and control departments, woodlands division, and the sawmill are reviewed; brief reference is made to the activities of the purchasing and engineering departments in connection with this program. 12 illustrations and 1 flowsheet. E.S.

PAPER AS A TEXTILE MATERIAL

ANON. Aktiebolaget Wahlbecks Fabriker, Linköping. Svensk Papperstidn. 53, no. 12: 337-40 (June 30, 1950). [In Swedish]

The history of the Swedish firm is outlined, which started in 1876 with the manufacture of ropes from Russian hemp; in 1930, the manufacture of binder twine from imported sisal was begun. During the second world war, the manufacture of paper yarn was introduced on a large scale and nearly all binder twine was made from it. The peak demand for this product in the immediate postwar period is gradually decreasing, as sisal supplies are again becoming readily available; however, the great price difference between the two products—even if sisal prices should decline and paper prices rise—makes the use of paper binder twine attractive. The author predicts its continued, although not exclusive, use in Swedish agriculture. 3 illustrations. E.S.

PAPER MACHINE OPERATION

FARMER, C. T. Sticking at the press—its nature and remedy. Australian Pulp & Paper Ind., Tech. Assoc., Proc. 3: 105-14; discussion: 114-20 (December, 1949).

At the Maryvale mill of the Australian Paper Manufacturers Ltd., a very costly operating difficulty was caused by the tendency of the sheet to adhere to the smooth press roll of the Fourdrinier machine. To avoid sticking troubles as much as possible, it was necessary to overcook the eucalypt wood. When sticking occurred, it was alleviated by the addition of soda ash solution to the pond before the doctor, although this procedure had many disadvantages. The author describes the experiments and observations that led to the discovery that all substances which form sparingly dissociated compounds with iron and aluminium ions will prevent sticking when applied in dilute solution to the press roll. This discovery made possible the selection of Calgon as a preventive reagent vastly more suitable than soda ash. The author submits a hypothesis to explain the cause of sticking, its prevention, and related phenomena. At Maryvale the continuous addition of two pounds of Calgon per day to the press-roll pond completely prevents sticking and allows the use of hard pulps from which it would otherwise be impossible to make paper on this machine. 1 reference. E.S.

OLIVE, G. W. Some effects of varying machine conditions. World's Paper Trade Rev. 133, no. 26: 1838, 1840, 1843-4 (June 29, 1950); Paper-Maker (London) 120, no. 1: 27-30 (July, 1950).

The author describes experimental paper-machine runs in which three factors were varied; either the shake, the dandy, or the intermediate calender (one calender nip in the middle of the drier section of the paper machine) was omitted. The effects on bulk, burst, and tearing and tensile strengths in both machine and cross-machine directions are discussed and illustrated in tables and block graphs. The results indicate that the best all-round sheets

were obtained when either all three devices were used (in which case the best tensile strength was obtained), or when only the calender was omitted (which resulted in the highest burst factor). 6 tables, 4 diagrams, and 1 reference. E.S.

PAPER MANUFACTURE

CRAIG, F. A. Practical paper making. No. 4. The sizing and loading of paper. Paper & Print 23, no. 2: 186, 188, 190, 192 (Summer, 1950); *cf.* B.I.P.C. 20: 728.

Following a brief history of the practice of sizing and loading paper, the modern methods are described. Paper may be made resistant, in varying degrees, to the penetration of water, ink, varnish, oil, or grease by tub-sizing, engine-sizing, or hydration; each of these processes is described in some detail. The addition of loadings to paper imparts qualities that are essential to some papers, chief of which are opacity and printability. The procedures for loading with china clay, calcium sulfate, and titanium oxide are outlined. 1 illustration. J.A.B.

OBERMANNS, HENRY E. Recent advances in paper chemistry and technology. The Science Counselor (Duquesne Univ. Press) 12, no. 3: 85-6, 106 (September, 1949).

A brief popular account is given of the chemistry of papermaking, industrial processes and equipment, and the many new types of paper now on the market. 1 illustration. E.S.

PAPER SIZING

ANON. Paper sizing. Wochbl. Papierfabr. 78, no. 11: 305 (June 15, 1950). [In German]

A brief reference is made to the advantages of emulsified montan waxes for the sizing of paper, particularly to its stability as compared with rosin size, which is liable to deteriorate through oxidation. E.S.

PETROV, A. P. Desizing of paper. Bumazh. Prom. 24, no. 5: 10-15 (September-October, 1949). [In Russian]

The phenomenon of desizing is well-known to papermakers; in some cases, the breakdown takes place in the finished paper; in others deterioration diminishes with the passage of time. It is known that paper sizes are broken down by the action of sunlight, electrical discharge, and certain chemicals; under the influence of these external factors, the size loses its setting properties, and its bond with the fibers is broken. Sometimes the reverse action is noted; frequently a high-rosin size improves with aging. The sizing process is not always accomplished on the machine; the reaction often starts in the beater and continues in the finished paper. A theoretical discussion is given of the chemico-colloidal nature of the sizing reaction. The results of aging tests conducted on a sized writing paper are included. 2 tables, 2 figures, and 7 references. E.G.S.

PAPER SPECIALTIES

ANON. Bonner's bonanza. Modern Packaging 23, no. 11: 124-6 (July, 1950).

The new luxurious-looking, flavor-protecting, heat-sealing aluminum foil packages designed for the Bonner Packing Co., Fresno, Calif., for their line of dried fruits are described. The package designs feature true, natural-color

photographs of the fruit, with a minimum of printed material. Five varieties of the fruit in their individual packages are grouped in a two-piece window carton for multiple sales. 5 illustrations and 1 sample wrapper. J.A.B.

ANON. Cauliflower in foil. Modern Packaging 23, no. 11: 136-7 (July, 1950).

The wrapping of individual heads of cauliflower in aluminum foil was found to be very successful in test shipments recently made by M. S. Cunha & Co., Salinas, Calif. The foil pack more than doubles the number of heads packed in the standard pony crate, preserves the quality of the product, enhances display, and is handy in cooking. Exact price comparisons between the methods of packing cannot be drawn, but the foil-wrapped cauliflower is said to have brought a premium f.o.b. price. 6 illustrations. J.A.B.

ANON. Factory food services still offer a wide paper market. Paper Sales 10, no. 7: 9-11, 36 (July, 1950).

The results of a survey conducted by the Paper Cup and Container Institute show that small industrial plants, employing less than 1000 people, offer a large potential market for paper products. Examples are given of the common types of food services found in these plants and the various paper items used in order to maintain sanitary standards and save space, time, and money. 3 illustrations. J.A.B.

ANON. Paper making by hand in 1950, an art in which Great Britain has excelled for centuries. Brit. Paper, Export Issue: 6-9, 11-12, 14, 16, 18, 21 (May, 1950). [In English, French, and Spanish] *cf.* B.I.P.C. 7: 51-2.

The process of making paper by hand is outlined, as still practiced at the Maidstone, Kent, handmade paper mill of J. Barcham Green, Ltd. The activities and manipulations of the vatman, the coucher, the layer, the upper end boy, and the slice boy are described, supplemented by 11 illustrations. E.S.

ANON. Pull-apart label provides recipe 'card.' Packaging Parade 18, no. 210: 38-9 (July, 1950).

An illustrated 3 by 5-inch recipe card has been made an integral part of the new label adopted by the Ten-B-Low Co., Columbus, Ohio, for its eight-flavor line of ice-cream concentrate. The five-inch extension wraps around the can under the regular portion of the label and conveniently pulls apart at the glue lap when the label is cut along a dotted line. A special automatic labeler was developed for applying the extra-long labels. 6 illustrations. J.A.B.

ANON. Sealed-in cutting life. Modern Packaging 23, no. 11: 106-7 (July, 1950).

The new factory-sealed packages for cut-off wheels adopted by the Chicago Wheel & Mfg. Co. utilizes wax-laminated glassine with a rubber-derivative lacquer coating; this material is supplied in the form of precut sheets, which are folded around the wheels and sealed on three sides by means of a bar-type heat sealer with foot-pedal control. The problem of moisture deterioration of the abrasive wheels is solved by the use of these packages; they are sufficiently transparent to permit the use of inside identification disks, and they are relatively inexpensive. 4 illustrations. J.A.B.

BERKMAN, E. M. Improving the quality of paper for offset printing. Bumazh. Prom. 25, no. 1: 10-14 (January-February, 1950). [In Russian]

An outline is given of the basic operating conditions for the successful manufacture of offset paper. A stock consistency of not more than 4.5% should be maintained in the beater; at higher consistencies an unsatisfactory pulp is obtained. The beater knives should not be thicker than 8 mm., and the bedplate bars not thicker than 4-5 mm. The fibers are shortened by refining just enough to produce a paper of uniform texture. Beating should be terminated at 26-28° S.-R., so that the pulp which passes through the jordan will have a beating degree of not more than 30° S.-R. as it goes to the paper machine. In order to reduce dusting, it is recommended that 1% of starch be added to the pulp in the form of size. For the production of a paper with good formation characteristics, the stock consistency at the headbox should be 0.55-0.75% for paper with a weight of 70-100 g./sq. m., and 0.75-1.0% for a weight of 100-160 g./sq. m. It is expedient to increase the orientation of fibers in the machine direction in order to improve the dimensional stability of the paper; to accomplish this end, the discharge of pulp to the wire should be maintained at a somewhat lower rate than the speed of the wire. Depending upon given production conditions, the operation of the shake should be held within the following limits: amplitude, 3-6 mm., and frequency, 200-250 shakes per minute. The surface temperature of the driers should increase gradually from one drier to the next, so that the temperature of the first drier after the press does not exceed 50° C. To reduce cockling of the wet offset paper, the maximum tension should be maintained on the drier felt. In slitting offset paper, it is always necessary that the length of the finished sheet correspond with the machine direction of the paper.

E.G.S.

ENGLER, W. N. Paper in Western Union operation. Paper Trade J. 131, no. 3: 25-6, 28, 30, 32 (July 20, 1950).

Reference is made to the many types of technical and nontechnical papers used in the operations of Western Union (approximately 15 million pounds per year) and the strict specifications to which the technical papers must adhere under the widely varying atmospheric conditions prevailing from Florida to Maine, from the Atlantic to the Pacific Coast, and from Newfoundland to the Azores. Certain phases of the company's testing program are described, including standard routine tests and special procedures for perforator tape, gummed manila tape, Teledeltos recording paper, and black wax-coated Desk-Fax transmission paper. 6 illustrations and 5 references.

E.S.

KULEV, I. G. Manufacture of photographic base paper. Bumazh. Prom. 24, no. 6: 18-21 (November-December, 1949). [In Russian]

The general and specific requirements of a photographic base paper are: absence of bubble formation on wetting; minimum residual deformation and shrinkage after wetting and subsequent drying; absence of metallic particles, particularly iron, and iron salts in the paper; and, in the case of a transparent photographic base, satisfactory transparency. In the absence of a legal standard quality of water for the manufacture of photographic base paper, it is recommended that the water contain not more than 0.1 mg. of iron salts per liter, that it show no trace of free chlorine, and that it carry no sand or mud. If the iron salt content of the water is subject to seasonal variations, the water should be aerated and pretreated with alumina crystals

or sodium hexametaphosphate to precipitate the iron salts. A bleached sulfite pulp which has the following composition is suggested for use in the manufacture of photographic paper: α-cellulose, 90-92%; hemicelluloses (calculated as pentosans), not more than 3-4%; and ash, not more than 0.2-0.3%. 3 photomicrographs. E.G.S.

LANGE, WILHELM. German colored papers and their techniques. Wochbl. Papierfabr. 78, no. 11: 302-3 (June 15, 1950). [In German]

The principal types, differentiating characteristics, and applications of German colored papers are outlined, including batik and java papers, gelatin papers, paste papers, crinkle papers, metallic papers, spray-dyed papers, marble papers, friction-glazed papers, and special bookbinding papers (satin paper, calf paper, crystal paper, mohair paper, velour paper, etc.). E.S.

MAISH, H. H. C. Paper for photogravure printing. Paper & Print 23, no. 2: 184 (Summer, 1950).

Photogravure printing requires a paper which has a smooth, even surface and is relatively soft, permitting a quick, even absorption of ink. Esparto-content papers are excellent for this type of printing, but are expensive; wood-free and groundwood papers also give good results. The process is described briefly. J.A.B.

"VINETT." Antique book papers. Paper Market: 130 (May, 1950); British Paper, Export Issue: 18, 50 (May, 1950).

The term "antique" originally referred to papers impressed with irregularly laid lines by the dandy roll and later to both wove and laid machine-made papers which possessed a roughened surface similar to the original cartridge papers; it is used today as a reference to the lack of finish imparted to the surface of a paper. The modern antique paper is principally used in the production of books printed in simple letterpress without illustrations. The two chief grades are featherweight and hard, and the majority are made from esparto grass. Whereas featherweights may be all grass, the hard qualities contain a certain percentage of wood pulp in the furnish, and some are produced from sulfite pulp alone. Recently, an attempt has been made to popularize bulky antiques subjected to a slight finish (rolled or satin-finish antiques). The importance of the grain direction of paper in the production of books is emphasized; the sheets should be folded with the grain parallel to the spine of the book. E.S.

WINTER, J. D. Sheet materials for wrapping frozen foods. Sci. Monthly 71, no. 1: 61-4 (July, 1950).

A review is presented of the factors in packaging and wrapping materials which exert an influence on the retention of quality in frozen foods, particularly oxygen and moisture-vapor transmission. The materials should also be sufficiently strong, greaseproof, odorless, and easy to mark, and should not become brittle and crack at low temperatures; in addition, they should possess good moldability and wet strength. The importance of the correct handling and storage of the wrappings is emphasized. The properties of the four principal types of sheet material used for this purpose (transparent films, aluminum foil, laminated and coated sheets, and waxed locker papers) are discussed; in conclusion, reference is made to locker-plant and home-packaging wrapping costs. 1 table, 2 figures, and 12 references. E.S.

PARTICLE SIZE

GRAY, VINCENT R. Surface films and particle size determination of powders. Can. J. Research B 28, no. 6: 277-91 (June, 1950).

The author has found it possible to spread almost any powder on a water surface in a layer one particle thick and to study its surface pressure-area relation by conventional film-balance techniques. A special sprinkler was developed for placing the powder on the surface, and flotation agents were adsorbed on particles which do not normally float. Fine particles required extended outgassing and drying before they were sufficiently deflocculated. Although all films collapsed more or less readily on compression, it was possible to define a point in the compression curve which represented a rigid film. The thickness of this film was a definite fraction of the mean particle diameter, measured by microscopic methods, the fraction varying with ease of agglomeration and with the shape of the particles. This method can be used for measurement of mean particle size and possesses certain advantages over existing methods for many purposes. 1 table, 13 figures, and 9 references. E.S.

PATENTS

SMITH, LYDIA MARIE, and WILKES, J. F. Bibliography of patent literature. Chem. Bull. (Chicago) 37, no. 3: 21-2; no. 6: 17-20 (March, June, 1950).

To provide background data and up-to-date information concerning the operation of the United States patent system, including its laws, policies, and procedures, a bibliography of patent literature has been compiled. In the first part, new books and standard reference works are listed which cover the general fields of patent laws and procedures; the second part deals with pertinent articles published in technical, trade, and business periodicals during the past five years. E.S.

PENETRATION

STAMM, ALFRED J., and TARKOW, HAROLD. Penetration of cellulose fibers. J. Phys. Colloid Chem. 54, no. 6: 745-53 (June, 1950).

Fibers of pure cellulose and lignocellulosic materials such as wood can be directly penetrated only by polar liquids. These liquids, except for a small correction for adsorption compression, add their volume to the volume of the cell walls, indicating that they are not entering existing voids but are forming a solid solution with the fibers. The extent to which a liquid will penetrate fibers and swell them appears to be dependent upon the ability of the liquid to form hydrogen bonds with the hydroxyl groups of cellulose and the lignin, and also upon the size of the liquid molecules. Although solutions may penetrate the fibers much more slowly than the solvent in a number of cases, they eventually swell wood more than does either component alone. This enhanced swelling can be explained on the basis of an equilibrium between sorption, solution pressure, and structural resistance. Nonpolar liquids, which do not by themselves penetrate fibers, can replace polar liquids already in the fibers except for the monomolecularly held portion of the polar liquid. Only partially expanded aerogels can thus be made from cellulosic fibers. 6 figures and 27 references. E.S.

PHOTOGRAPHY

NIEMEYER, JOHN H. High speed photography in paper mill maintenance. Paper Trade J. 131, no. 2: 22, 24 (July 13, 1950); Paper Mill News 73, no. 34: 20-1 (Aug. 26, 1950).

The Kodak high-speed camera is described, which is capable of operating at a speed of 90,000 r.p.m. A 32-volt universal motor is used, to which 115

volts are applied; the camera is started at a lower voltage, which is increased gradually by an interconnected rheostat. A synchronizer switch which either opens or closes an external switch after a predetermined time and an automatic cutout switch are additional features. This camera may be advantageously used to discover the source of difficulties in high-speed machines. J.A.B.

PHOTOMICROGRAPHY

HARRISON, V. G. W. Adaptation of the microscope for stereophotography. Paper Market: 140-1 (May, 1950); British Paper, Export Issue: 20-1 (May, 1950); Paper-Maker (London) 119: 44, 46 (Mid-summer, 1950).

The author mentions the advantages of stereoscopy in microscopy and describes the adaptation of an old Pillischer binocular microscope for the stereophotomicrography of opaque specimens (such as surfaces of paper, printed boards, printing plates, etc.), including illumination, cameras, and photographic technique. 1 illustration. E.S.

PHYSICAL TESTING—INK

STEINBRUNNER, JOSEPH. Printing inks. Tappi 33, no. 7: 67-9A (July, 1950).

The author briefly reviews instruments and tests for evaluating printing inks and their behavior on uncoated and coated papers. E.S.

PHYSICAL TESTING—PAPER

CARTER, H. S. The correlation of paper testing instruments. Australian Pulp & Paper Ind., Tech. Assoc., Proc. 3: 252-69 (December, 1949).

The author discusses the problems involved in efforts to ensure that accurate results are obtained from paper testing instruments. A brief description is given of the methods used for correlating instruments, together with details of a number of investigations made of certain aspects of correlation procedure. Further details are then given of actual correlation results for water resistance (TAPPI dry indicator method), air resistance (densometers), internal tearing resistance, burst, and tensile strength. From the figures and information given it is shown that, to obtain accurate results, it is necessary to observe strict maintenance and checking schedules, to eliminate serious operator errors, and to consider the establishment by the Australian Pulp and Paper Industry Technical Association of a research section to investigate thoroughly the testing instruments themselves and the procedures used in the paper industry. 8 tables and 5 references. E.S.

DAY, FREDERICK T. Paper testing for the paper user. No. 2. Paper & Print 23, no. 2: 141-2, 144, 146 (Summer, 1950); *cf.* B.I.P.C. 20: 733.

The physical aspect of paper testing is considered in this nontechnical review of devices for testing size, weight, caliper, tensile strength, tearing strength, bursting strength, fastness to light, and other properties. Laboratory testing of paper and techniques for the microscopic examination of paper fibers are mentioned briefly. 5 illustrations. J.A.B.

MARTIN, A. WARRINGTON. Calibration and maintenance of paper testing instruments. Australian Pulp & Paper Ind., Tech. Assoc., Proc. 3: 245-51 (December, 1949).

A program of systematic, preventive maintenance is essential if paper testing instruments are to provide reliable results. Incipient faults must be detected and corrected before the results are significantly affected. Frequent inspections, checks, and calibration provide the information necessary to determine what adjustments are needed, and recalibration indicates whether or not the adjustment has been made successfully Systematic records are needed, both to provide the basis for continual review of the maintenance timetable and to inform the papermaker of the success of the preventive maintenance. 2 references. E.S.

NADEBAUM, O. O. Conditions of relative humidity and temperature for paper testing in Australia. Australian Pulp & Paper Ind., Tech. Assoc., Proc. 3: 199-211 (December, 1949).

Conditions of relative humidity and temperature are compared between North American and Australian cities. The greater extremes of temperature experienced in North America make it necessary to heat factories and dwellings more there, giving rise to lower relative humidities indoors. From a survey of the relevant literature, the author shows how these drier indoor conditions contributed in 1941 to the adoption of 73° F. and 50% R.H. as standards for paper testing. From a review of outdoor conditions in Australian capital cities, the indoor conditions are deduced to be considerably more humid than is the case in North America. Because of this, no change is recommended from the existing Australian standard conditions of 70° and 65% R.H., without first making an exhaustive survey of the conditions under which paper is converted and used in Australia. 9 tables and 15 references. E.S.

PHYSICAL TESTING—PAPER—COLOR

FOGELBERG, B. C. The determination of whiteness. Paper and Timber (Finland) 32, no. 5: 132-5 (May, 1950). [In Swedish; English summary]

The author describes different possibilities for the numerical expression of whiteness, the advantages and disadvantages of different instruments, the preparation of samples, and the methods for measuring whiteness. In the Finnish Central Laboratory five different photoelectric colorimeters are in use, i.e., the G.E. brightness tester (I), the Leukometer (II), the Photovolt (III), and the Hunter (IV) and Evans (V) instruments. (II) gives in general the lowest, and (IV) the highest values. The values for bleached sulfite and white papers obtained with (I) and (III) are rather close, although (III) gives higher values for the darker shades than (I). The Photovolt instrument at the Central Laboratory has a tendency to give higher values with time. Although different results are obtained with different instruments and procedures, in general a correlation between trends exists, which makes conversion possible. 3 diagrams and 5 references. E.S.

PHYSICAL TESTING—PAPER—SIZE RESISTANCE

BINNEY AND SMITH AND ASHBY, Limited, *London.* Degree of sizing of paper. World's Paper Trade Rev. 134, no. 1: 28 (July 6, 1950).

A brief description is given of an apparatus for testing the size resistance of paper. Constructed according to Carson's method and specified for use under French standards AFNOR Q2-2, the instrument measures the time in seconds which distilled water at 15° C. takes to pass through half the thickness of paper. According to the type of paper to be tested, its thickness

and sizing degree, the end of the sample protruding from the vessel curves upward more or less rapidly until the liquid reaches halfway through the paper; when this stage is reached, the curving movement ceases, and the end of the paper begins to drop. The time is recorded when the upward movement stops; a squared mirror behind the vessel facilitates observation. 1 illustration. E.S.

NORDMAN, L. The suitability of the Cobb test for determining the size resistance of paper. Paper and Timber (Finland) 32, no. 5: 129-31 (May, 1950). [In Swedish; English summary]

The author discusses certain factors which exert an influence on the Cobb sizing or absorbency test (*cf.* B.I.P.C. 4: 193-4). A curve is given which illustrates the influence of the entrapped air. When the tests are carried out on the back or groundwood side of duplex cardboard, a higher absorbency is obtained if the comparatively nonporous pulp layer on the opposite side is torn off. When the whole sample, except for the area to be tested, is coated with a thin film of Pliolite, the absorbency of the sample decreases. For hard-sized papers, the absorbency bears a nearly straight-line relationship to the square root of the absorption time. In the case of slack-sized papers it has been found that for laboratory sheets of increasing basis weight or for several sheets used in a pile, the absorbency curve plotted against the total substance of the sample goes through a maximum and then drops sharply, whereas for hard-sized papers a constant absorbency value is reached when the basis weight of the sample is increased. The peak in the curve for slack-sized sheets is probably caused by the simultaneous action of different absorption-retarding and -promoting factors when the substance is increased. The author employed a dye solution (Trypan blue-black) in most of his experiments and found that the dye had a certain influence upon absorptivity, particularly in the case of the slack-sized papers. The American and British practice of applying water instead of a dye solution is therefore recommended. 5 curves and 6 references. E.S.

PHYSICAL TESTING—PAPER—TEARING STRENGTH

COHEN, W. E., and WATSON, A. J. The measurement of internal tearing resistance. Australian Pulp & Paper Ind., Tech. Assoc., Proc. 3: 212-44 (December, 1949).

The authors discuss instruments, based on the original design of Elmendorf, for the measurement of internal tearing resistance. In particular, reference is made to the Thwing-Elmendorf and Marx-Elmendorf instruments. Some emphasis is laid on the definition of internal tearing resistance on which the calibration of these instruments is based in order to reconcile tear values reported in Australia with those reported from some countries which supply pulp to Australia. Mention is made of some of the disabilities of the above-mentioned instruments and of some modifications which have been made in attempts to improve their performances. In order to eliminate an obvious design defect in the sector of the Thwing-Elmendorf instrument which automatically invalidates all tests made with it, an instrument known as the Dynamic tear tester has been designed and manufactured in Australia. A brief description of this instrument and of its performance and versatility is given in order to provide an experimental background for its formal adoption by APPITA as the standard instrument for Australia where, in fact, it is already used exclusively. The results of an investigation of some of the variables of the tearing test are discussed. Emphasis is laid on the need for more complete standardization of the method of testing than is practiced overseas. The importance of specifying not only specimen dimensions but also

the number of sheets to be torn in each test is stressed in particular, as well as the need of adhering to this number in all tests on all papers. This is facilitated by providing the Dynamic tear tester with three interchangeable sectors, each having a different capacity. In this respect, the method of testing which is used in Australia does not conform with those presently specified by oversea organizations. It is also important that each specimen should be torn only once, and that the tear should be located centrally within the specimen. It is proposed that APPITA should formally adopt this method for the measurement of internal tearing resistance. 12 tables, 5 figures, and 8 references. E.S.

PHYSICAL TESTING—PAPER—THICKNESS

COVENTRY GAUGE AND TOOL COMPANY, LTD. *Fletchamstead, Coventry.* "Matrix" paper and board micrometer. World's Paper Trade Rev. 134, no. 1: 50 (July 6, 1950).

A brief description of a simple, yet highly accurate paper and board micrometer is given. The results may be read off the dial without further calculations; the heavy base allows it to stand solidly on its support, so that both hands are left free to manipulate large sheets of stock. 1 illustration. E.S.

PHYSICAL TESTING—PAPER—WET STRENGTH

REICH, J. G. Determination of wet strength. Das Papier 4, no. 12: 237-40 (June, 1950). [In German]

The technique of wetting the sample for a specified time period and then placing under a definite pressure between filter papers for 30 seconds may lead to certain errors in the determination of wet strength (I). Frequently the results are too high. The most exact method for determining (I) consists in tearing the paper strip while submerged in water, in a simple modification of the Schopper tear tester. The necessary additional equipment and its operation are fully described. The older method for determining (I) can also be successfully modified by using nonabsorptive, well-sized writing papers (II) in place of filter papers. The results of numerous tests show that the two procedures give almost identical values; (II) has certain advantages for routine testing. 3 tables, 1 diagram, and 4 footnotes. L.E.W.

PHYSICAL TESTING—PULP

JAYME, G. Pulp characteristics influencing paper strength properties. Australian Pulp & Paper Ind., Tech. Assoc., Proc. 3: 432-68; discussion: 468-78 (December, 1949).

The German standard method for testing the strength of pulps, based upon the Jokro mill as beating apparatus and the Rapid-Koethen equipment for sheet forming and drying, gives reliable, well-differentiated, reproducible results. The morphological factors which influence the strength of papers are fiber length and fiber-length distribution, as well as the thickness of the cell wall. The fiber length of Australian eucalypt woods was found to be higher than that of European beech, but lower than that of European black poplar hybrids. Fiber length predominantly determines the tearing resistance, whereas the thickness of the cell wall affects all strength properties. Thick-walled, tubelike fibers lead to papers of higher bulk, higher porosity, and lower strength. The importance of the connection between density of wood and paper strength is stressed. As to chemical characteristics, it has been proved that the D.P. of cellulose in pulps should be as high as possible, preferably above 1400. Methods are given for obtaining such a

high D.P. The presence of lignin in pulps has a very pronounced detrimental effect on strength properties, especially on folding endurance. Delignification of an unbleached pulp by means of sodium chlorite in a slightly acid medium always leads to an increase of strength. If a well-controlled multistage bleaching system is applied, using "overchlorination" as one of the first steps, a bleached pulp of high brightness can be obtained, the average strength of which considerably surpasses that of the original unbleached pulp. More complex is the influence of hemicelluloses on strength properties. It has been found that a certain optimum of hemicellulose contents exists, below and above which average strength of pulps, developed by beating, decreases. Precipitation of hemicelluloses within fibers having a hemicellulose deficiency causes a marked strength increase as well as enhanced tendency to parchmentize. All these factors singly and jointly influence strength properties in the sense discussed, and these interrelationships have not been interpreted in many publications. A method has been developed for the rapid and simple measurement of the swelling degree of pulps; all influences leading to a decrease of swelling degree of pulps must be considered detrimental to the strength of papers prepared from the pulps. Data are given for the rate of hornification (irreversible reduction of swelling degree) by drying and heating in suspension. The influence of the presence of aluminum sulfate on swelling degree has also been measured. The biostructure of fibers plays an important role during the mechanical beating process. It is to be assumed that the state of the primary wall definitely determines the beating resistance of fibers. Finally, an example is given in the line of future research problems. The large difference observed in the behavior of papers prepared from sulfite and sulfate pulps is most probably caused, not only by different chemical composition, but also by a different distribution of lignin and especially hemicelluloses within the cell wall. A detailed account is given to explain why a sulfate pulp of a lower D.P. should lead to the production of papers of higher strength than does a sulfite pulp with a higher D.P. 8 tables, 22 figures, and 22 references. E.S.

PHYSICAL TESTING—PULP—CUPRAMMONIUM VISCOSITY

DOERING, HELMUT. Pulp viscosity determination. Das Papier 4, no. 11: 197-9 (June, 1950). [In German]

The importance of excluding air from cuprammonium hydroxide pulp solutions (I) in making viscosity determinations is emphasized. In a well-sealed powder flask, (I) is shaken with 20 grams of carefully cleaned metallic copper wire (1.5 gram pieces) per 100 ml. of (I), which serves to exclude most of the air above (I), removes oxygen from residual air and, on protracted shaking, serves to disintegrate the pulp. Thus the use of nitrogen is avoided, and the viscosity remains unchanged even when (I) stands overnight. The technique is described in detail with sketches of equipment; it replaces satisfactorily the far more expensive cupriethylenediamine method of Straus and Levy (*cf.* B.I.P.C. 12: 179). 1 figure and 3 references. L.E.W.

PHYSICAL TESTING—PULP—SAMPLING

BERGSTRÖM, JAN. The determination of the dry content of wood pulp. Svensk Papperstidn. 53, no. 11: 295-305 (June 15, 1950). [In Swedish; English summary]

To determine the dry content of a bale of wood pulp, a partial test must always be applied; to render such a test reliable, random sampling is required. In this sense, the British wedge method of sampling can be considered satisfactory, whereas the American boring method and the French diagonal

method are unsatisfactory. The results of such studies will always be more or less uncertain and subject to errors, the magnitude of which can be estimated by statistical means. More than one value is required for making such calculations, and hence it is proposed that the samples be divided into a number of groups, each of which should be tested separately. The theory of statistical sampling and related topics of mathematical statistics are discussed briefly, together with examples showing the application of these principles to the determination of the dry content of a shipment of wood pulp. The number of samples required to obtain a certain accuracy depends on the magnitude of the variations between dry content and bale weights. The size of a shipment governs the selection of the number of representative bales. Formulas are given from which the number of bales and samples required can be estimated. In most cases it would be of advantage to take considerably more samples per bale than according to present rules; the number of bales sampled could thereby by greatly reduced. A check of a test can be made by plotting the mean values of the bale weight and the percentage of the dry contents from different groups against each other and by examining the distribution of the bale weights. Disagreements concerning the amount of dry weight in a shipment caused by divergent test results can hardly be settled without a statistical investigation of the figures upon which the stated results are based. To establish a claim for short weight, it should be necessary to prove that the shortage is statistically significant. 4 tables, 10 figures, and 17 references. E.S.

PHYSICAL TESTING—WAX

HOAG, L. E. Modulus of rupture test for paraffin wax. Tappi 33, no. 7: 343-5 (July, 1950).

The modulus of rupture of paraffin wax is determined by breaking small prepared slabs of paraffin by applying a load midway between two supports. The load is controlled by flowing water into a plastic bucket suspended from the ends of the loading bar that rests on the slab of wax. The paraffin slabs are prepared by casting over water. Equipment for performing this test is commercially available. Data showing the stiffening effect of paraffin on paper and the function of the modulus of rupture on this effect are presented, as well as evidence of the reproducibility of the test. 3 tables and 4 figures. E.S.

PIGMENTS

LUSSEYRAN, PIERRE. Pure titanium oxide in paper manufacture. Papeterie 72, no. 6: 305, 307, 309, 311 (June, 1950). [In French]

The author describes the use of titanium oxide for improving the opacity and whiteness of paper and economizing on raw materials. Its use in Bible, cigarette, condenser, writing, book, typewriter, document, parchment, glassine, waxed, and coated papers is discussed briefly; optimum amounts to be added to the stock are given frequently. The effects of calendering, methods of application, and factors affecting retention are outlined. L.E.W.

PINE

FREESE, FRANK, JR. Pine growth doubled by improvement cutting. Paper Trade J. 131, no. 3: 34 (July 20, 1950).

Brief reference is made to the fact that new young shortleaf and loblolly pines near Birmingham, Ala. have nearly doubled their growth in two years after they were released from overtopping hardwoods. E.S.

PLASTIC FILMS (NONCELLULOSIC)

SIMRIL, V. L., and HERSHBERGER, A. Permeability of polymeric films to gases. Modern Plastics 27, no. 11: 95-6, 98, 100, 102 (July, 1950); *cf.* B.I.P.C. 20: 808.

The permeabilities of 21 polymeric films to oxygen, hydrogen, carbon dioxide, nitrogen, ammonia, hydrogen sulfide, and sulfur dioxide, both dry and moist, were studied. The data are presented in terms of a permeability constant P and are interpreted in terms of the structures and physical properties of the films and the gases. In general, it may be said that gas permeation increases with any decrease in the bonding forces between the polymer molecules of the film and with any increase in the attractive forces between film and gas. Thus, highly polar, strongly bound polymers are less permeable to nonpolar gases than are the less polar, weakly bound polymers. The introduction of side chains onto the main polymer chains, the introduction of plasticizers, and the presence of water all tend to increase permeability. Certain significant deviations from this general rule are noted and discussed. 8 tables, 2 figures, and 9 references. E.S.

PLASTICS

JACKSON, E. W. Glass fibre laminates in cartography. Brit. Plastics 22, no. 253: 272-80 (June, 1950).

The results are given of investigations of various materials, such as cellulose acetate film, polystyrene film, vinylite film, wet-strength paper, and paper made with glass fibers, for their possible use in making maps and charts. None of these were found to be satisfactory, but it was demonstrated that a dimensionally reliable white sheet, suitable for cartographic purposes, can be produced on a laboratory scale by bonding together several layers of fine-mesh woven glass fabric with a suitable cross-linking transparent resin. When polystyrene is used for this purpose, the resulting laminate has excellent properties, except for an inherent greasiness; this difficulty may be eliminated by rubbing the surface with cotton wool moistened with a dilute solution of gelatin and Teepol. The tendency of the material to be distorted by mild heating can be overcome only by modifying the photographic process to eliminate heating. Diallyl phthalate laminates were found to be very satisfactory with regard to dimensional stability, absorption of ink, and ability to withstand heat. 2 tables and 7 figures. J.A.B.

PENN, W. S. Plastics and paper. World's Paper Trade Rev. 133, no. 21: 1476-8 (May 25, 1950).

The author considers the relationship of the two industries to each other and discusses uses of pulp and paper in plastics and the application of plastics in the paper industry: (*a*) the use of cellulose and pulp (cellulose plastics, α-pulp as a filler, and resin-pulp moldings); (*b*) paper as a filler (in paper-base laminates); (*c*) treatment of paper (improvement of wet strength, different types of coatings); and (*d*) associated matters (spraying of plastic coatings and high-vacuum coating of plastics or paper with metals, plastic tubes, tank linings with a plastic coating, machinery parts from laminated stock, plastic laboratory ware, and similar items). 8 references. E.S.

PLASTICS—TESTING

AXILROD, BENJAMIN M., and SHERMAN, MARTHA A. Strength of heat-resistant laminated plastics up to 300° C. J. Research Natl. Bur. Standards 45, no. 1: 65-84 (July, 1950).

The flexural properties of samples of glass-fabric laminates were determined for several conditions of heating and testing. The laminates tested were bonded with various resins, including unsaturated polyester, acrylic silicone, phenolic, and melamine types. Flexural tests were made under the following conditions: (1) at 25° C. and 50% R.H. after 200 hours of heating at a temperature *T;* (2) at a temperature *T* after 0.5 hour at the temperature *T;* (3) at a temperature *T* after 200 hours at the temperature *T;* and (4) at 25° and 50% R.H. without heating prior to testing. The temperature *T* was 150, 200, and 250° for condition 1; 150, 200, 250, 300, and 375° for condition 2; and 150, 200, 250, and 325° for condition 3. The one sample of silicone resin laminate tested was superior to the other laminates in retention of flexural properties at temperatures of 250° or higher. The single phenolic laminate tested showed good retention of flexural properties when tested at elevated temperatures after 0.5 hour of heating. After prolonged heating the behavior of the phenolic sample was much less satisfactory, the strength being almost negligible at 250°. The sample of melamine laminate was superior to the phenolic in retention of flexural strength after prolonged heating at 200 and 250°. The polyester laminates lost at least 80% of their flexural strength when tested at 250°. For each laminate and each test condition, the loss in modulus of elasticity correlated with the loss in flexural strength, but the former loss was less than the latter. The results of one test in which duplicate sets of specimens were heated in still air and in rapidly moving air indicate that the loss of flexural properties during prolonged heating may depend on the method of exposing the specimens. 9 tables, 10 figures, and 10 references. E.S.

PRINTING AND PRINTER'S INK

DAY, FREDERICK T. The use of metallic inks as an aid to sales. Brit. Packer 12, no. 6: 28, 50 (June, 1950).

An outstanding and individual package or printed item may be achieved through the use of metallic inks, which are available in gold, silver, and pastel shades. The importance of using the most suitable paper is emphasized; the most attractive results are obtained by the use of a good quality supercalendered printing in a medium substance. Any of the well-known imitation art papers and most cover and label papers give good results. Mention is made of metallic inks in connection with offset litho printing, silk screen printing, and blocking foil. J.A.B.

KING, CHARLES F. Accurate color control. Inland Printer 125, no. 4: 40-3 (July, 1950).

Of all the specifications to which the printer is asked to adhere, those concerning color cause him the most trouble. Among the factors affecting color are the type and speed of the press, pressure, roller setting, temperature of the press and the room, the physical properties of the ink, fountain water in the case of offset printing, and the ink receptivity of the paper. If the sheet is varnished or lacquered after printing, variations in the thickness of the film may also cause discoloration. As yet, no completely satisfactory instrument has become available for reading color, but even a poor instrument is better than the human eye. The ideal instrument would be capable of scanning every inch of a wet printed surface and determining the shade it will assume when dry. J.A.B.

L. The technique of bronze printing. Allg. Papier-Rundschau no. 11: 554 (June 15, 1950). [In German]

The paper for bronze printing must be well sized, smooth, and free from acid, chlorine and, particularly, sulfur, and possess a well-closed surface. The sizing and bronze powders must not react with each other; the latter must also be free from sulfur compounds and fat. The finished sheets are subsequently burnished by calendering between metal rolls or by blind stamping, preferably with a moderately heated printing plate; care, however, must be taken that no overheating takes place which might result in poor adhesion and discoloration of the bronze powders. E.S.

TUTTLE, DOUGLAS E., and HOLLAND, O. C. Aniline printing—I and II. Modern Packaging 23, no. 10: 145-51; no. 11: 159-62 (June, July, 1950).

In the first part of the article, the history of the aniline printing process (rotary rubber-plate printing with a one-, two-, or three-roller fountain system), its advantages and limitations, the basic printing unit, complete aniline presses, the preparation of cylinders and plates, and mounting and registering are described. In the second part, inks and coatings and their proper selection for different stocks, drying equipment, and commercial printing speeds receive consideration. Aniline printing is the fastest growing printing method in the packaging field. Stocks no longer offer any serious problems; coated, lacquered, and fancy papers, gummed and pressure-sensitive tapes, aluminum foils, cellophane, boxboard, corrugated board, and the most troublesome plastic films have been successfully printed with aniline inks. 20 illustrations. E.S.

VOET, ANDRIES. Ink flying—its cause and prevention. Patra J. 13, no. 1: 17-27 (1950).

In high-speed printing, ink is drawn out in filaments against elastic forces acting in the liquid, and after filament rupture, the fractured parts retract to the roller instantaneously. When simultaneous multiple filament rupture occurs, ink is ejected from the press; fractured filaments and ejected drops bear an electric charge, which promotes ink flying. In water-in-oil types of emulsion inks, which have a markedly increased dielectric constant, the number of multiple filament breaks and the repulsive electric forces in the filaments are greatly reduced. Satisfactory emulsion news inks with a reduced tendency to flying can be made on a commercial basis with the aid of certain long-chain, nonaromatic amines. 2 figures and 11 references. J.A.B.

RADIOACTIVITY

FEARNSIDE, K. Radio-active isotopes in the paper industry. Part 2. Detection and measurement. World's Paper Trade Rev. 133, no. 26: 1832, 1834, 1836 (June 29, 1950); *cf.* B.I.P.C. 20: 740.

Radioactive isotopes are detected by their radiations, which have the power of ionizing the materials through which they pass. A brief description of the methods and instruments used for this purpose is given (quartz-fiber electrometer, ionization chamber, photographic detection, Geiger counter, and phosphor and photomultiplier tubes), including a table summarizing the various forms of detection arrangements and their suitability for specified purposes. 2 figures. E.S.

RAYON—STATISTICS

RAYON OR'GANON. World rayon production. Rayon Or'ganon 21, no. 6: entire issue (June, 1950); *cf.* B.I.P.C. 19: 802.

Almost the entire issue is devoted to statistical information on world rayon production, including tables and diagrams and a list of rayon producers. World production in 1949 amounted to 2,704,620,000 pounds, an increase of 10% over 1948; the viscose process accounted for 75%, the acetate process for 23%, and the cuprammonium process for 2% of the total. Cotton continued as the most important textile fiber and amounted to 74% of the total three-fiber world production; it was followed by rayon with 14%, and wool with 12%. Silk production was only nominal. E.S.

RAYON—VISCOSE PROCESS

LEITSO, HEIKKI. Production of rayon by the viscose process. Can. Chem. Process Inds. 34, no. 7: 563-7 (July, 1950).

The author describes the different steps and chemical reactions involved in the viscose process. Reference is made to the latest expansion program of Courtaulds (Canada) Limited in Cornwall, Ont., which included a new central viscose plant, a high-tenacity yarn unit, and a staple fiber unit. The present annual capacity of the plant is 14,000,000 pounds of textile yarns, 9,000,000 pounds of high-tenacity yarn, and 10,000,000 pounds of staple fiber. 6 illustrations. E.S.

RESIN, SYNTHETIC

NEWBERG, RAYMOND G. New uses of hydrocarbon plastics for packaging. Paper Trade J. 131, no. 3: 32, 34 (July 20, 1950); Modern Packaging 23, no. 10: 141-2 (June, 1950).

Polyethylene, polyisobutylene, and all other S-Polymers are saturated long-chain hydrocarbon plastics of high molecular weight, which are similar in many of their physical properties, yet differ in others. Their general properties and packaging applications are described; they show considerable promise for self-supported films, paper and fabric coatings, hot-melt coating, hot-melt adhesives, capsules for aqueous and alcoholic solutions, and asphalt modifications for manufacturing laminated paper bags. The resins may be used either singly or collectively to solve many of the most difficult packaging problems; for instance, the versatility of polyethylene can be increased by blending it with polyisobutylene (trade name Vistanex). E.S.

ROOFING FELTS

ANON. Bird & Son's new felt mill at Shreveport, Louisiana. Paper Mill News 73, no. 27: 8-9 (July 8, 1950).

A brief illustrated description of the installations of the new felt mill is given; rags, wood, and old papers are utilized as raw material and natural gas is used in the power plant. 6 illustrations. E.S.

RUBBER

COULTER, N. D., and VAUGHAN, P. J. Pliofilm. Modern Packaging 23, no. 11: 153-8 (July, 1950).

Because of its strength and durability, moisture and flavor retention, controlled gas diffusion, transparency, and ease of fabrication, Pliofilm has found application in a great variety of packaging fields. It is available in 12 compositions and eight gages, totaling 25 types of film; the production procedures for some of these films are described. Closure is usually accomplished by heat-sealing, but adhesives are available for bonding Pliofilm to itself or to other packaging materials. Pliofilm may be printed by the letterpress or rotogravure processes, and special aniline inks have been developed for use

on highly flexible grades. Some of the newer applications of Pliofilm are in the prepackaging of heavy produce items, frozen-food packaging, the dried-fruit industry, and the squeezable oleomargarine pouch. 3 tables, 12 figures, and 11 references. J.A.B.

SALESMAN AND SALESMANSHIP

ANON. Just what is a good paper salesman? Paper & Twine J. 24, no. 4: 11-12, 14 (June, 1950).

In addition to the general requirements for a good salesman, the successful paper salesman needs more intensive product knowledge than is required in many other industries. He must know how to survey his customers' requirements and suggest the best products for their purposes, because in most cases the customer lacks the necessary knowledge for the proper selection of papers. In the paper industry, good service signifies good selling and involves much more than the prompt delivery of the goods. E.S.

ANON. Postwar sampling by a manufacturer. Am. Paper Merchant 47, no. 7: 17, 22 (July, 1950).

The functional sample kit of specialty papers, which the Rhinelander Paper Co. issued for its distributors and consumers, is described. It consists of an expansible outside container in a convenient file size holding individual envelopes in which the samples are enclosed. Each envelope carries the technical description and specifications of the samples. Each kit is dated and will be supplied periodically with fresh samples either by company mailings or salesmen's calls. 2 illustrations. E.S.

SEMI-CHEMICAL PULPING PROCESS

PAPER AND INDUSTRIAL APPLIANCES, INCORPORATED. The Chemipulper for board. Fibre Containers 35, no. 7: 70-1 (July, 1950).

The Chemipulper is a combination of the Asplund Defibrator and the (B-K) Beveridge-Kehoe reaction chamber and employs the principle of continuous cooking; hard- or softwoods or a mixture of both can be employed. Two diagrams are included; one illustrates a six-tube reaction-chamber unit with auxiliary equipment for producing semichemical, high-yield pulp for corrugating board, whereas the other depicts an eight-tube reaction-chamber unit for the production of neutral sulfite or kraft pulps for corrugating board and a comparatively wide range of other products. The pulping variables of time, temperature, and chemicals are all under control, resulting in uniform products and contributing to ease and flexibility of operating conditions. 2 figures. E.S.

SHIPPING CONTAINERS

ANON. ICC decision favors wooden box in egg case hearing. Shears 68, no. 691: 48, 51 (July, 1950); *cf.* B.I.P.C. 19: 722.

The Interstate Commerce Commission recently ruled against raising the estimated weight from 53 to 56 pounds for eggs packed in 30-dozen standard fiber or wood cases (ICC Suspension Docket No. 5634). It also denied that the application of one weight to fiber and wood cases alike was prejudicial, and fiber box interests failed to secure a weight differential. Even though weight tests in various parts of the country indicated a difference of 4.28 pounds between the average fiber case and the average wooden one, the Commission doubted that such a differential justified separate estimated weights. It is predicted that the proponents of weight revisions will continue their efforts. J.A.B.

AREND, A. G. Developments in weatherproof cartons. Brit. Packer 12, no. 6: 34 (June, 1950).

The production of weatherproof cartons differs from that of ordinary containers only in timing speeds and the amount of the reduced size of board stock required. These improved containers are not damaged by water, are 4% stiffer than normal cartons, may be re-used, and have twice the strength of corresponding grades of board. The cost of the best grade of weatherproof container board is about five times that of ordinary fiberboard, but savings are realized in transportation charges and reduced damage costs. J.A.B.

SHIPPING CONTAINERS—FIBER DRUMS

LAHEY, R. W. Fiber drums. Chem. Eng. 57, no. 7: 217-20 (July, 1950).

One of the most significant of the recent changes in chemical packaging practices is the adoption of the fiber drum to meet the highly specialized requirements of chemical and pharmaceutical compounds. Each manufacturer of these containers has developed a particular construction, the only standard being the convolutely wound shell. The various methods of attaching the bottoms, securing the covers, and introducing water-vapor barriers and other protective linings are described. Fiber drums are fabricated in sizes from ¾ to 75 gallons capacity and may be used for transporting up to 400 pounds in a single drum. They may be palletized and tiered within certain limits, but should not be rolled except in special storage racks. Some of the advantages of these containers are: ease of emptying, complete reclamation of contents, reclosure features, light weight, and re-use possibilities. 1 table and 17 illustrations. J.A.B.

SHIPPING CONTAINERS—TESTING

PAINE, F. A. Four case histories on package testing. Patra J. 13, no. 1: 9-16 (1950).

Four typical problems presented to PATRA's package testing station are described, and their solutions are given. Breakage of glass food jars packed in corrugated fiberboard cases was found to be a result of inadequate internal cushioning; a comparison of four types of internal packing for whisky bottles transported in wooden cases indicated that they differed very little, but the use of steel wire or strapping around the case improved its strength; two paper bags with different behavior were tested for bursting strength, and one was found to be constructed of weaker paper; and excessive breakage in a package containing small cosmetic jars was eliminated by modifying the internal partitions. 4 tables and 5 figures. J.A.B.

SILICATE OF SODA

WILLS, JOHN H., and SAMS, ROBERT H. Adhesion of sodium silicate to metal. Tappi 33, no. 7: 82-3A (July, 1950).

Reference is made to the fact that the addition of Mersize (rosin-maleic anhydride condensation product made by Monsanto) will reduce the bond between sodium silicate and hot metals to a low value, without weakening the strength of the silicate-paper bond. This is of particular interest for the cleaning of the metal hotplates used in converting machinery. The slight residue remaining on the metal after the use of a scraper is worn away by the abrasion of the paper web passing over it, without detrimental effects to the latter. 1 table. E.S.

SLIME PREVENTION

KLOPOV, V. M. Prevention of slime formation in a closed-cycle white-water system. Bumazh. Prom. 25, no. 2: 13-18 (March-April, 1950). [In Russian]

The most effective toxicants are mercury compounds, such as ethylmercuric chloride, ethylmercuric phosphate, phenylmercuric lactate, and ethylmercuric hydroxide. Very low concentrations are adequate for the prevention of slime formation; for example, an addition of only 5 mg. of 6% ethylmercuric phosphate per liter is required. Dihydroxydiphenylmethane, the sodium salt of naphthalenesulfonic acid, and their various mixtures have also been used for some time. In a few cases, slime control has been accomplished with a single chemical. The amount of chemical added varies with the type of fiber; in paper production, for instance, the concentration is twice that required for the production of wood pulp. 1 figure. E.G.S.

RUDOLFS, WILLEM, and NEMEROW, NELSON L. Some factors affecting slime formation and freeness in boardmill stock. Tappi 33, no. 7: 321-7 (July, 1950).

Recirculation of white water is a common practice in most paperboard mills as a method of pollution abatement and of conservation of fiber, filler, and water. Slime, one of the major nuisances resulting from this recirculation, causes a decrease in the drainage rate (freeness) of the stock which is measured by a laboratory handsheet machine. Slime forms to some extent when white water is recirculated without pH control and in a temperature range of 20 to 37° C. The extent of slime growth and its optimum growth temperature will vary somewhat from one board mill to the next. A pH of 4.5 or a temperature of 50° was found to prevent slime growth. Replacement of the nonsettleable portion of white water with fresh water, before recirculation, inhibits slime growth. Slime formation is greatly stimulated by casein, slightly stimulated by starch, and not affected at all by rosin. 4 tables, 9 figures, and 3 references. E.S.

SOLVENT CLEANING

ROBINSON, B. P. Chemical cleaning of filter beds. Southern Pulp Paper Manuf. 13, no. 7: 42, 44 (July, 1950).

The author outlines the procedures for cleaning fouled filter beds with chemical solvents. A properly designed operation is based upon a chemical analysis of the filter media, whereupon the proper solvent formula can be compounded and the amount of solvent calculated. The best solvents are of the acid-base type; hydrochloric acid is generally preferred because of its effectiveness, ease of handling, and low cost. Inhibitors, wetting agents, intensifying agents, etc., may be added to the solvents to increase their effectiveness. Limitations and hazards involved in cleaning filter beds and necessary precautions are listed. 1 table and 1 diagram, illustrating the cleaning of a pressure-type water filter. E.S.

STAINS AND STAINING

SIMONS, FRANCIS L. A stain for use in the microscopy of beaten fibers. Tappi 33, no. 7: 312-14 (July, 1950).

A two-color differential stain for papermaking fibers is described which employs a direct blue dye (Pontamine sky blue 6BX greenish, British Colour Index no. 518) and a direct orange dye (Pontamine fast orange 6RN conc.,

C.I. no. 621). Unbeaten fibers are stained blue, whereas beaten fibers are stained varying mixtures of orange and blue, depending on the degree of beating. The method is relatively independent of the kind of fiber. Staining is done directly on the microscope slide by a simple procedure. E.S.

STARCH

BECHTEL, WELKER G. Measurements of properties of corn starch gels. J. Colloid Sci. 5, no. 3: 260-70 (June, 1950).

By means of an embedded-disk gelometer the properties of starch gels can be determined with adequate precision to distinguish between consecutive commercial grades of acid-modified cornstarches, and between gels of the same starch which differ by 0.5% in starch concentration. Gels of acid-modified as well as unmodified cornstarch are elastic to the yield point. The percentage increase in rigidity and breaking strength of gels during aging from 4 to 24 hours depends on the modification of the starch. The increase is greater for starches of higher modification. The effect of temperature of cooking starches on the properties of their gels varies with the degree of modification of the starch. With increasing modification of the starch, the consistency of the hot pastes of acid-modified cornstarches decreases to a greater extent than do the rigidity and breaking strength of their gels. 6 tables, 2 figures, and 17 references. E.S.

KATZBECK, WALTER J., and KERR, RALPH W. Amylose complexes. J. Am. Chem. Soc. 72, no. 7: 3208-11 (July, 1950).

The preparation of an amorphous form of amylose is described. Amorphous amylose, in the solid form, adsorbs only trace amounts of butyl alcohol vapor, fatty acid, and about 4% of iodine, the latter being less than that absorbed by amylose in the frozen gel and retrograded states. The negative results obtained with amorphous amylose are taken as proof that amylose-complex formation is not an adsorption phenomenon. Only the "V" form of amylose is found to take up significant quantities of iodine vapor, butyl alcohol, and fatty acid, confirming the conclusion that a particular molecular configuration of amylose is a necessary requisite for complex formation. Moisture assists complex formation between "V" form amylose and iodine vapor, butyl alcohol, and fatty acid, and its effect, accordingly, appears to be physical rather than chemical. 5 tables, 1 figure, and 19 references. E.S.

REDFERN, SUTTON. Recent developments in amylase chemistry. Wallerstein Labs. Communs. 13, no. 41: 89-114 (June, 1950).

A review is presented under the subheadings: general features and occurrence of amylases, β-amylase, α-amylase, individual amylase systems (bacterial and fungal amylases and enzymes other than amylases effective in starch hydrolysis), purification and crystallization of amylases, active or essential groups of amylases, amylase inhibitors, and measurement of amylase activity (liquefaction, dextrinization, and saccharification methods, determination of β-amylase, and comparison of different amylases). 2 tables, 9 figures, and 117 references. E.S.

STATISTICAL METHODS

ANDERSSON, OLLE. Statistics as an auxiliary tool in the control of operations in the pulp and paper industry. Svensk Papperstidn. 53, no. 10: 249-57 (May 31, 1950). [In Swedish; English summary]

The advantages and limitations of statistics in the pulp and paper industry are discussed; examples of applications are given. 12 diagrams. E.S.

STEAM POWER

DIXON, M. H., BLOOMQUIST, W. C., and WILSON, W. B. Selection of steam pressures and temperatures for paper mill power plants. Tappi 33, no. 7: 305-12 (July, 1950).

The purpose of the article is to present various performance data which will enable the paper mill power engineer to select the proper turbine or combination of turbines to give optimum economy and operating flexibility. The data should be particularly useful in studying the mill heat balance to secure the proper relation between electric power and process steam. From these data, steam flows, exhaust and extraction temperatures, and electric energy produced by steam turbine-generators for paper mill power plants can be readily determined. By use of these data the performance of condensing, noncondensing, and extraction-type turbines can be estimated for a range of initial and process steam pressures. 1 table, 9 figures, and 6 references. E.S.

HAGE, GERALD S. River Raisin's new power plant after one year of operation. Paper Mill News 73, no. 29: 12-13 (July 22, 1950); *cf.* B.I.P.C. 20: 521.

A brief illustrated description of the new power plant is given. 4 figures. E.S.

STRAW

RENAUD, R. Research on straw pulp; experimental comparison of different processes for the preparation of chemical pulps. Chimie & industrie 63, no. 3: 252-7; no. 6: 625-32 (March, June, 1950). [In French]

Laboratory work, sponsored by various French organizations, was started in 1942 to study the various industrial processes used in many European countries for making paper from straw. The following processes were investigated: (1) digestion with soda at high pressure; (2) multistage digestion with soda at atmospheric pressure; (3) the sulfate process; (4) the monosulfite process; (5) delignification with gaseous chlorine, after preliminary digestion with soda; and (6) delignification with chlorine water, also after digestion with soda. Each of these processes was carried out, using various digestion periods and concentrations of reagents in attempts to arrive at optimum conditions. Then the pulps were submitted to a further standardized bleaching operation. The following conclusions were reached: (1) the cellulose content of the pulp increases with the degree of digestion and is practically invariant among the products of the different processes; (2) delignification is most complete in those processes utilizing chlorine; (3) the pentosan content is only slightly affected by the degree of cooking and is noticeably reduced only in the multistage soda process at atmospheric pressure; (4) the alcohol-benzene extract decreases with the degree of cooking; (5) the copper number is highest in the product of gaseous chlorination, in which the chlorine exercises some oxidative effect upon cellulose; (6) the product of the chlorination processes is lowest in ash content; (7) bleaching to a high whiteness results in an appreciably reduced cellulose content and in increased copper number. Tables are presented in which comparisons are made of the properties of papers produced by each of the processes from pulps prepared at the same levels of digestion,

bleaching, and beating. The consumption of reagents, the yields, and the chemical analyses of the papers are also given. The conclusion is drawn that straw is readily pulped by a wide variety of available methods. The products of all processes are so similar that the ultimate choice as to which one should be employed by a mill is determined almost solely by economic considerations. Straw pulps can be used alone or in conjunction with other pulps in making paper. The author discusses the necessity for expanding the market for straw pulp and suggests that an economy might be effected if straw pulp were to be produced at sugar refineries and at distilleries where there are large stocks of wheat on hand and where the heating units remain idle for nine months of the year. 12 tables, 2 figures, and 6 footnotes. S.S.

STREAM POLLUTION

DOBSON, JOHN G. Control of sewer losses. Tappi 33, no. 7: 78-82A (July, 1950).

The loss of chemicals and fibers to the sewer can be substantially reduced by a continuous survey and control of these losses. At the same time a substantial reduction can be made in stream pollution. The first step in such a survey is the accurate measurement of sewer flow, which can be made with venturis, orifice plates, or in most cases with weirs or flumes. The next step is accurate sampling, integrated in terms of total flow. This can be done by sampling pumps operating for times which are proportional to the actual flow. The samples should be analyzed for the important constituent, and the results be made available to the men responsible for operating the particular section of the plant. In the selection of the pump, the amount of semisolids present in the waste must be taken into account. The sampling points should be selected so that a truly representative sample is obtained. Instantaneous readings and signals of changes of chemical compositions can be obtained with conductivity or pH instruments. Records should be maintained so that long-period trends can be established. 6 figures. E.S.

GIBBS, FRED S. New approach to industrial waste treatment. Instrumentation 4, no. 5: 8-9 (April-June, 1950).

Reference is made to the Gibbs system with automatic Brown-Beckman pH control for treating industrial wastes; the application of the controlled pH flotation principles to the effluents of a soap and a board mill is described, supplemented by two flowsheets and three illustrations. E.S.

MOHLMAN, F. W. Waste disposal as a factor in plant location. Chem. Eng. Progress 46, no. 7: 321-7; discussion: 327 (July, 1950).

The location of industries should be decided after the consequences of the discharge of wastes into the nearest stream, lake, or harbor have received careful consideration. The resulting pollution may require abatement for a number of reasons. The experiences with various types of industries and contacts with many waste problems (neutralization of acids and alkalies; reduction of oil, scum, and colloidal or soluble organic matter; removal of sludge-forming solids or specific chemicals; and regional problems) are described to show the variety of problems encountered, and the methods by which the problems have been alleviated. The degree or type of treatment varies in nearly all cases, unless wastes are highly diluted in admixture with sewage, and normal biological sewage-treatment methods can be used. This is the situation desired by most industries, but care must be taken that the sewage is considerably in excess, otherwise the complications may be worse than if

no sewage were present. When new industries are to be established or old industries encounter pollution problems, the best course for the industrial concern is a thorough study of its wastes and the best method of treatment. It can then decide what measures can be justifiably taken in order to meet city, state, federal, or international demands for waste abatement. The problem is complex and can only be solved by the joint efforts of engineers, chemists, and biologists. 2 tables and 4 figures. E.S.

SULFITE LIQUOR

DHUS, E. F. Steam-jet vacuum refrigeration for control of sulphite acid composition. Tappi 33, no. 7: 333-5 (July, 1950).

The temperature of the water used in making sulfite cooking acid of the proper composition is important. Refrigeration is sometimes required to obtain the correct temperature. The advantages and principles of operation of steam-jet vacuum refrigeration are given. The installation and operation of the system at the Hammermill Paper Co. are described. 1 table, 1 illustration, and 1 reference. E.S.

SULFITE PROCESS

LØSCHBRANDT, F. Researches of the chemical pulp division of the Norwegian Pulp and Paper Research Institute during 1949. I. Cooking experiments with waste liquor. II. The determination of the residual lignin in bleached pulp. Norsk Skogind. 4, no. 5: 119-36 (May, 1950). [In Norwegian; English summary]

I. The influence of repeated additions of sulfite waste liquor (I) on the results of magnesium- and calcium-base cooks at a maximum temperature of 135° C. has been studied, and methods for the determination of acids other than sulfurous acid in (I) are discussed. In agreement with previous investigators (Hägglund, Sundman) it was found that for short cooking cycles (strong sulfite), acceptable pulp qualities can be produced, provided that the acid conditions during the cook are carefully controlled. A certain decrease in the sugar content of (I) and, hence, in alcohol yield, is unavoidable with this procedure. However, when the digestion periods are extended, the cooking conditions become unstable and the results unpredictable. The whiteness of the resulting pulps is low; however, they can readily be bleached with chlorite to 95% whiteness (measured with the Institute's whiteness tester). More favorable results may be expected if somewhat lower maximum temperatures are employed. No significant differences were found between calcium and magnesium cooks. 1 table and 18 diagrams.

II. The method of Giertz (*cf.* B.I.P.C. 16: 226) for determining the residual lignin by means of a colorimeter has been modified by substituting a Beckman quartz spectrophotometer, and the spectral distribution of the ultraviolet absorption of sulfuric acid solutions of highly bleached sulfite pulps has been studied at different stages of the reaction. The absorption was found to increase linearly with time at all wavelengths, so that an extrapolation to zero time is possible. The reasons are discussed for identifying the ordinate of intersection at zero time with lignin, and the increase in absorption with time up to six hours with the formation of hydroxymethylfurfural (II). The rate of formation of (II) seems to vary considerably with different pulps and appears to be intimately connected with their degree of purification, particularly their hemicellulose content. At prolonged reaction periods unknown substances are formed. The shortcomings of the present techniques are discussed and necessary improvements are outlined, which would allow the correlation of the results of this method with the use requirements of a given pulp. 1 table and 10 diagrams. E.S.

SULFITE PROCESS—AMMONIA BASE

BENSON, HENRY K. Ammonia pulping of wood. Pulp & Paper 24, no. 8: 74, 76 (July, 1950).

The feasibility of the ammonia-base cooking process is discussed, and its advantages over the calcium-base sulfite process are listed. Although ammonia costs more than calcium, its use as a cooking agent has shown a number of compensating factors, such as increased yield of pulp, shorter time of penetration and cooking, wider choice in range of wood species, higher quality of pulp, and greater ease of operation and recovery processes for avoiding water and air pollution. In given cases, these factors may well compensate in dollar value for the difference in cost of the chemical reagents. E.S.

SULFITE PROCESS—REDDENING OF PULP

ADLER, ERICH, and HÄGGROTH, STEN. Reddening of sulfite pulp. I. Studies on the mechanism and inhibition of reddening. Svensk Papperstidn. 53, no. 11: 287-94 (June 15, 1950). [In German; English and Swedish summaries]

The authors studied the mechanism of reddening of unbleached sulfite pulp by measuring the light reflection of reddened pulp at different wavelengths in a Hardy spectrophometer. When compared with a magnesium oxide plate, the reddened pulp shows a reflection minimum at 510-520 mμ. The substances responsible for this coloration exist in fresh pulp in a reduced, i.e., leuco form. When the reducing substances in the pulp, such as sulfite, are destroyed by air oxidation during aging, the leuco form gradually becomes oxidized to the red form which, in turn, is further oxidized to weakly or noncolored products. When pulp in a spontaneous reddening condition is moistened, rapid oxidation of the leuco form takes place, and an accumulation of the red-colored component results. Reddening, whether caused by air oxidation or oxidizing agents, such as hydrogen peroxide, nitrite, or hypochlorite, requires the presence of heavy metal ions which act as catalysts. The formation of complexes of these heavy metal ions with various compounds, such as ethylenediamine tetraacetate (I), sodium pyrophosphate, or sodium hexametaphosphate, will prevent the reddening of pulp. The technical significance of utilizing this principle for the prevention of the discoloration of the pulp on storage is discussed. Reference is made to the fact that reddening may reoccur, when the treated pulp, after storage and during processing in the paper mill, again comes in contact with heavy metal ions. Glassine and greaseproof papers (which are manufactured from freshly cooked and never from stored pulp) may show a spontaneous reddening of the finished paper. The addition of (I) (claimed to be nontoxic by the American manufacturer) to the stock prior to or on the paper machine might prevent this tendency and also be applicable to food wrappings. (I) was found not to reduce noticeably the toxic effect of phenylmercuric acetate. The red spots caused by the mold *Penicillium roqueforti* and the coloring substance of the present investigation were compared and found to originate from different sources. 8 figures and 14 references. E.S.

ADLER, ERICH, and HÄGGROTH, STEN. Reddening of sulfite pulp. II. Studies concerning the chemical nature of the reddening component. Svensk Papperstidn. 53, no. 12: 321-6 (June 30, 1950). [In German; English and Swedish summaries]

Experiments for determining the chemical nature of the substances or groupings responsible for the reddening of unbleached sulfite pulp are

described. Purified lignosulfonic acid, oxidized either in aqueous solution by means of oxidizing agents or in sodium chloride solution by means of cupric ions and air, gives a light-transmission curve of the same general type as the light-reflection curve of the reddened pulp. The transmission minimum of a reddened lignosulfonic acid solution lies at 510 mμ. Model experiments with pyrocatechol, substituted pyrocatechols, as well as the corresponding *o*-quinones did not allow any conclusive results as to whether or not these structures are of significance in the reddening of the pulp. However, the possibility that the reddening is caused by the presence of an *o*-quinone structure in lignosulfonic acid cannot be excluded. An apparently satisfactory model substance for the reddening phenomenon was found in 3,3′-dimethoxy-4,4′-dihydroxystilbene. This substance oxidizes under "reddening conditions" to the corresponding stilbene quinone which, when adsorbed on pulp, gives a red color of the same spectral type as the reddened pulp. 4 figures and 11 references. E.S.

SULFITE WASTE LIQUOR

SCHWABE, K. The electrolytic chlorination of sulfite waste liquor. Monatsh. 81, no. 4: 609-12 (June 15, 1950). [In German]

A short report is given on the electrolytic chlorination of sulfite waste liquor. The lignosulfonic acid exerts a strong depolarizing action with platinum or graphite electrodes in acid, neutral, or alkaline solutions. Likewise, the sodium salt of propioguaiacone-α-sulfonic acid produces a depolarizing effect. Hypochlorite formation did not occur even at a high current density, because the chlorine reacted immediately with the sulfite waste liquor solids. Sulfite waste liquor treated with ammonium carbonate to remove the calcium was chlorinated in a diaphragm cell with graphite anodes. When the electrolysis was carried out in alkaline solution (*N* potassium hydroxide, 2 *N* potassium chloride), a water-insoluble fraction (5.1% chlorine, 6.4% sulfur, and 10.4% methoxyl) and a water-soluble fraction (28.5% chlorine, 7.3% sulfur, and 4.88% methoxyl) were obtained. Evidently, a part of the chlorine taken up by the sulfite waste liquor solids was split off by the alkali. Storing the chlorinated product also resulted in a loss of chlorine. Electrolysis in hydrochloric acid solution followed by distillation of the anode solution resulted in 1-2% (based on sulfite waste liquor solids) of acetaldehyde as well as chloro- and dichloroacetaldehyde. The chlorinated product isolated from the distillation residue contained 11.3% chlorine, 9.41% sulfur, and only 1.78% methoxyl. The distillation residue also contained a small amount of an acid having a melting point of 96° C. and an equivalent weight of 61.7, which are the approximate values for glutaric acid. 6 footnotes. M.A.B.

SULFUR DIOXIDE

PLUMMER, A. W. Thermodynamic data for system SO_2-H_2O; bibliography and critical analysis. Chem. Eng. Progress 46, no. 7: 369-74 (July, 1950).

An exhaustive literature survey was made to locate equilibrium solubility-vapor pressure data for the system sulfur dioxide-water. The survey data are statistically correlated for sulfur dioxide concentrations of 0.03 to 10.0 g. sulfur dioxide/100 g. water and at temperatures of 0 to 130° C. The correlated results are presented as straight lines on an Othmer-Cox-type chart by the modification of the ordinate. Slopes and intercepts are also presented at all sulfur dioxide concentrations for the linear equation $\log_{10} P_m = b \log_{10} p_w + a$, which relates the variables. The use of the Othmer

method for this system is discussed. Heat effects calculated from the vapor-pressure curves are compared with those reported in the literature as independent determinations of heats of solution. The paucity of data above 130° is mentioned, and suggestions are made for further investigation in this region. A similarity of this system with seven other weak electrolytes is exhibited from changes in the first ionization constant with temperature. 4 tables, 2 figures, and 71 references. E.S.

TALL OIL

JENSEN, WALDEMAR. Chromatographic analysis of tall oil. III. Location of acidic matter in the column. Paper and Timber (Finland) 32, no. 5: 142-4 (May, 1950). [In English] *cf.* B.I.P.C. 20: 207-8.

One gram of a distilled tall oil (analyzed previously) in 10 ml. of ether was introduced into a 25-gram alumina column and eluted with ether. Thereupon the alumina was removed and divided into 10 parts with a razor; each part was then placed in a smaller tube and eluted with ethanol containing 1% acetic acid. The organic residue from each section which remained after evaporation of the alcohol and acid and drying was weighed. Thus, it was shown that the upper half of the original column held most of the fatty acids, whereas an appreciable part of the resinous portions was in the lower sections of the alumina. This was confirmed by chromatographing a mixture of resin and oleic acids. However, a quantitative separation of fatty and resin acids could not be effected directly, and it appears that in such a separation it is first necessary to esterify the fatty acids in the mixture, as previously suggested by the author. 1 table, 3 illustrations, and 3 references. L.E.W.

JOHANSON, STIG. Tall oil rosin acids and their use for paper sizing. Svensk Papperstidn. 53, no. 10: 258-65 (May 31, 1950). [In English; German and Swedish summaries]

Tall oil rosin acids (I) have been satisfactorily used for a number of years in the Scandinavian countries for the sizing of paper and board. The author reviews the literature on the subject. (I) are not chemically homogeneous substances, but contain, in addition, certain amounts of fatty acids, esters, hydroxy acids, and unsaponifiable material; these exert a more or less pronounced influence upon such properties as color, the tendency to crystallize (II), and the melting point (III). In general, (I) available on the market are lighter in color than gum or wood rosins. By partial saponification with caustic soda or sodium carbonate, (II) and (III) may be modified, although these properties are also contingent upon the isomeric rosin acids present in (I). The drastic isolation of (I) from the sulfate soap and the subsequent distillation at 250-285° C. furthers the isomerization of the rosin acids. (I) obtained by distillation with a high content of abietic and pyroabietic acids, have a high (II). This pronounced tendency is the reason that (I) are not suitable for the preparation of emulsified sizes with a high free-rosin content, such as the Bewoid size; on the other hand, they are very suitable for the preparation of completely saponified sizes, such as the Delthirna size. Opinions vary with regard to the influence of the hydroxy acids upon the sizing efficiency of (I). The unsaponifiable component, if present in large quantities, can cause sizing difficulties, whereas the fatty acids do not seem to exert any adverse effect when their amount does not exceed 20%. In summary, it may be stated that laboratory and mill experiences indicate that the sizing efficiency of first-class (I) is equal to

that of standard American rosin size; however, the preparation of a good size from (I) is much more difficult. 10 tables, 6 figures, and 34 references. E.S.

WALDEN, E. Manufacturing of lubricating and emulsifying oils from tall oil. Paper and Timber (Finland) 32, no. 5: 140-1 (May, 1950). [In English]

The author describes a process for the cracking of tall oil for the manufacture of lubricating oils, which was developed in Finland and used from 1945-47. The capacity of the plant was four metric tons per day; operations were stopped as soon as sufficient supplies of foreign lubricating oils could be imported. 1 flowsheet and 3 illustrations. E.S.

TAXATION

ROBERTS, ARTHUR. Right supporting records ease tax load. Fibre Containers 35, no. 7: 56-8 (July, 1950).

Because tax rates are high, the taxpayer should take every permissible deduction, but in order to obtain all those which he is entitled to, he must have the correct records to be able to justify his deductions. The Treasury is checking returns more minutely than ever before. Many taxpayers, particularly the small operators, lack the auxiliary records which provide the necessary breakdown of the book figures. The author discusses the valuation placed on inventory, depreciation schedules, withholding tax forms, bad-debt ledger or file, detailed journal entries, sundry supporting papers, checkbooks, bankbooks and statements, and petty cash slips, which should be kept in satisfactory detail and be filed systematically to provide the necessary references which will justify the entries in the books of a firm. E.S.

TEXTILE INDUSTRY AND FABRICS—TESTING

QUYNN, RICHARD G., BERNET, EDWIN J., and FISCHER, EARL K. Gloss measurements on fabrics. Textile Research J. 20, no. 7: 492-509 (July, 1950).

The authors describe the experimental measurement of reflectance by means of a goniophotometer for a group of fabrics. The results are presented in the form of curves, computed gloss indexes or gloss numbers, and visual ratings by different observers. 2 tables, 25 diagrams, and 59 references. E.S.

WAGES

SILMAN, R. S. Production—incentives and bonus rates. Paper Box Bag Maker: 190-2 (May, 1950).

The author mentions several incentive systems introduced into British and American industries, most of which are based on a mathematical formula, which he considers a drawback. One important test which must be applied to any incentive system is whether the worker can understand it and is able to calculate his own wages; if he cannot do this, the system is not a good one. The author explains the Points Incentive System as applied by his company, which is really a combination of job evaluation and a good-behavior bonus. Points are allocated for the nature of work, skill, operator's willingness to co-operate and his general conduct, regularity of attendance, attention to tasks during working hours and quality of output, and exceptional qualifications. All employees below the status of foreman are included. The system was introduced in a small way without forcing it on anyone.

It was negotiated with the unions and tried in one department. After the trial period, the company waited for the other departments to ask for it, and all of them did in turn. A measure of whether a system is understood is the number of queries made by the workers on payday. During the old bonus system in use, the company's pay office was kept busy all payday and sometimes into the following morning, answering questions; after the introduction of the new system, very few questions are asked, about one or two per week. E.S.

WASTE HEAT

STEWART, D. L. Heat transfer from hot moist air in a spray tower. Pulp Paper Mag. Can. 51, no. 7: 121-5 (June, 1950); *cf.* B.I.P.C. 20: 127.

The author describes the full-sized steel spray tower of welded construction mounted on the roof above the newsprint machine No. 5 at Powell River to recover the waste heat from the hot moist air of the drier hood of the paper machine. The spray tower effluent will be used in the place of cold water for showers on the paper machine and for washing the groundwood pulp from western hemlock following brightening with zinc hydrosulfite. The tower is 50 feet high and 12 feet in diameter. If the heat-recovery system is completed as planned, two towers will be installed for each of three high-speed news machines. Powell River's new No. 8 machine has spray banks built into the economizer and will supply somewhat less hot water than each of the other three. The experimental work on a small pilot tower, the calculation of the coefficients, and the performance of the full-sized tower are described. The results were not as good as were expected from the test results on the pilot plant. The effect of operating variables, possible improvements, and alternatives are discussed. A sample calculation of coefficients from test data is included. 4 diagrams. E.S.

WAXES

DEAN, JOHN C. Waxes for protective packaging. Tappi 33, no. 7: 70A; discussion: 71-4A (July, 1950).

Following a brief discussion of the properties and applications of petroleum waxes in the paper- and board-converting industries, reference is made to recent developments with resin additives and oxidation inhibitors. The paper industry is the largest consumer of petroleum waxes and uses approximately 80% of the U. S. production. E.S.

WET STRENGTH

REICH, J. G. Comparative consideration in the use of urea and melamine resins in the production of wet-strength papers. Das Papier 4, no. 11: 189-97 (June, 1950). [In German]

The commercial melamine resin (I) (Mandurit M4) and urea resin (II) (Urecoll K) are, in the main, equally well-adapted for use in the manufacture of wet-strength papers, with a shade of preference given to (I). Papers containing (I) have a slightly higher wet strength and are somewhat more resistant to acid solutions. Papers from highly beaten stock containing (I) show a higher folding endurance and lower brittleness. Papers containing over 4% (II) are occasionally brittle. With papers prepared from medium-beaten stock, however, these differences disappear. A disadvantage of (I) is its higher cost, which is reflected in the increased cost of paper manufacture. Other difficulties in using (I) are the attendant odor of formaldehyde

when the stock solution is mixed, the necessity of heating the stock, and the prolonged paper storage required to insure adequate hardening of the resin. Pulps used in this study were bleached and unbleached sulfite and sulfate, with unbleached sulfate treated either with (I) or (II) showing the highest wet-strength properties. Full tabulated and graphic data giving methods of preparation and wet- and dry-strength properties of the papers are presented. The industrial uses of wet-strength papers are discussed. 3 tables, 12 figures, and 9 references. L.E.W.

WHITE WATER

APPLEBAUM, S. B. Water treatment pays by saving fiber. Pulp & Paper 24, no. 8: 78 (July, 1950); *cf.* B.I.P.C. 16: 529.

Reference is made to the successful operation of the Liquon white-water treatment plant at the Lansdowne, Pa. mill of the Hudson Pulp & Paper Corp. A brief description of the installation is given, consisting of a main treatment tank and an external concentrator. The chemical treatment involves the addition of aluminum sulfate and some activated silica; the recovered stock is reintroduced in the mixing box of the paper machine. The clarity of the treated water discharged into Darby Creek is claimed to be superior to that of the creek water itself; it contains only one-fourth pound of fiber per 1000 gallons of water, representing a 97% fiber removal. 2 diagrams. E.S.

CALISE, V. J. Some economic factors in waste water treatment. Chem. Eng. Progress 46, no. 7: 328-33; discussion: 333-4 (July, 1950).

The author discusses some of the economic factors which govern the selection and operation of waste-water treatment installations in certain industries, including acid and plating wastes, white waters from pulp and paper mills, and oil-bearing wastes from petroleum refineries and manufacturing plants. 3 tables, 11 figures, and 4 references. E.S.

CLINK, GEORGE. Application of the OCO water system to paper mill white water recovery. Paper Mill News 73, no. 26: 18-19 (July 1, 1950).

This is a condensation of the article by Ehemann and co-workers; see abstract below. 1 figure. E.S.

EHEMANN, GEORGE C., BURNETT, L. K., and WADDELL, JOHN C. Application of the OCO water system to paper mill white water recovery. Pulp Paper Mag. Can. 51, no. 7: 107-11 (June, 1950).

Application of the OCO water system to two of the four paperboard machines at the Ohio Boxboard Co. mill indicate the soundness of the principles involved. The OCO water system is defined as a program of selective return of high-solids process water to the system and positive filtration of the remaining low-solids water with a plate-and-frame type filter and a filter aid. The filtered water is substantially free of suspended solids and entirely suitable for low-volume, high-pressure felt and wire showers. The recovered solids are used satisfactorily as furnish. Results of three months' operation indicate that the system offers a practical solution to the recovery of industrial process water and should offer a means of conserving water, fibers, fillers, and heat now wasted and decreasing stream pollution caused by paper mill effluents. 5 figures, including 1 flowsheet. E.S.

WOOD—CHEMISTRY

BLAND, D. E. The chemistry of eucalypt woods. Australian Pulp & Paper Ind., Tech. Assoc., Proc. 3: 408-27; discussion: 427-31 (December, 1949).

The chemical composition of wood is discussed generally, and the field of the known chemistry of eucalypt woods is surveyed with reference to their preparation for analysis, the chemistry of their structural constituents and their extraneous substances, and the relationship of their constituents to one another. 5 figures and 35 references. E.S.

RUSSELL, P. Pitch, pentosans and paper. World's Paper Trade Rev. 133, no. 24: 1682, 1684, 1704 (June 15, 1950); Paper-Maker (London) 120, no. 1: 23-5 (July, 1950).

The author discusses the substances, other than cellulose, which are present in wood and their effects, if any, on pulp and papermaking. A brief consideration is given to: resins; lignin; pentosans; hemicelluloses; tannins; starch; natural oils, fats, and waxes; organic acids; alkaloids; and inorganic substances. 13 references. E.S.

WOOD—DECAY

PASCOE, T. A., and SCHEFFER, THEODORE C. Jack pine pulpwood deterioration in yard storage. Paper Trade J. 131, no. 2: 16-18, 20-1 (July 13, 1950).

A quantity of jack pine pulpwood was cut from a single tract in north central Wisconsin, sufficient to allow a number of mill-scale pulpings over a period of 26 months after cutting. Portions of the wood were in typical yard storage for 21 months of the period. Five mill-scale pulpings were made on the rough wood and two on the peeled wood, using the sulfate process. Pulp made at each storage interval was made into a standard grade of paper on the same paper machine. Auxiliary studies were carried out on the wood to determine the effect of the application of a fungicide, the rate of moisture and density loss, and associated amounts and degrees of decay. The density loss over the period for rough wood was 2.2 pounds per cubic foot. Laboratory-scale pulps were prepared at each storage interval, and laboratory beater tests were made on all pulps. The treatment with fungicide proved ineffective. Paper made from the mill-scale pulps from rough wood showed the greater loss in Mullen strength with increase in wood storage time, whereas laboratory beater tests on mill- and small-scale pulps showed the greater loss in tearing strength as wood storage time increased. The total decrease in strength of pulps would be serious in mill operations. Although the peeled wood incurred only negligible amounts of decay during storage, it showed some loss in the strength of pulps made therefrom. This loss was much less than that shown by the pulps made from rough wood. 5 tables, 9 figures, and 11 references. E.S.

WOOD—DENSITY

HUGHES, R. V., and MACKNEY, A. W. Density and moisture content of New Zealand *Pinus radiata* D. Don. Australian Pulp & Paper Ind., Tech. Assoc., Proc. 3: 387-404; discussion: 404-7 (December, 1949).

Results are presented to show within-log and between-log variations in basic density, green density, and moisture content for a total of 210 trees of *Pinus radiata* D. Don. The trees were collected in three groups at different

seasons from the Maraetai area of the North Island of New Zealand. Between-log comparison showed basic density to vary significantly with season, the lowest value being obtained in the season of maximum growth. Green density was shown to differ significantly between three classes, the trend being toward a lower value for the less vigorously growing trees. Moisture content values showed a wide variability with some evidence of significant differences between seasonal groups. The over-all mean values were 23.55 lb./cu. ft., 61.0 lb./cu. ft., and 161% for basic density, green density, and moisture content, respectively. Within-log comparisons for basic density showed increases from pith to sap and from top to butt of tree with an indication of infiltration of extraneous material at the butt pith causing a rise in density in that area. Green density was shown to rise sharply to a point distant approximately 25% of the tree volume from the pith; thereafter it rose slowly to a maximum of 67 lb./cu. ft. Moisture content was found to rise to a maximum at a distance of 20% by volume from the pith after which it showed a decrease. 3 tables, 8 figures, and 7 references. E.S.

WOOD—EXTRACTIVES

ALVAREZ-NÓVOA, JOSÉ C., ERDTMAN, HOLGER, and LINDSTEDT, GÖSTA. Constituents of pine heartwood. XIX. The heartwood of *Pinus pinea* L., *Pinus pinaster* Aiton, *Pinus halepensis* Mill., and *Pinus nigra* Arnold var. *calabrica* (Loudon) Schneider. Acta Chem. Scand. 4, no. 3: 444-7 (1950). [In English] *cf.* B.I.P.C. 20: 821.

The yields of different substances (expressed as a percentage of air-dried wood) are listed in the following table.

Species	Ether Extract	Membrane substances	L-Arabinose	Pinobanksin	Pinocembrin	Pinosylvin	Pinosylvin monomethyl ether
P. pinea	37	0.4	0.05	—	0.3	—	0.02
P. pináster	10	0.3	0.3	0.02	0.08	—	—
P. halepensis	42	0.2	—	—	—	0.03	0.2
P. nigra var. calabrica	31	0.06	0.03	—	—	—	0.4

Attention is drawn to the extremely high ether extractives in three of the pure heartwoods. 1 table and 2 references. L.E.W.

LINDSTEDT, GÖSTA. Constituents of pine heartwood. XX. Separation of phenolic heartwood constituents by paper partition chromatography. Acta Chem. Scand. 4, no. 3: 448-55 (1950). [In English]

A full description is given for the separation and identification of all nine phenolic substances hitherto found in pine heartwood extracts. The method furnishes a very rapid and sensitive technique, and can be carried out with small wood samples. The developing reagent is bis-diazotized benzidine. 1 table, 1 figure, and 13 references. L.E.W.

LINDSTEDT, GÖSTA. Constituents of pine heartwood. XXI. The structure of Pinobanksin. Acta Chem. Scand. 4, no. 5: 772-81 (1950). [In English]

Pinobanksin (1), a common pine heartwood component, is 3,5,7-trihydroxyflavanone (dihydrogalangin). The tribenzoate, the 7-monomethyl, and the 5,7-

dimethyl ethers are described. Dehydrogenation of (I) and its ether give the corresponding galangin derivatives. Rearrangement of the dimethyl ether of (I) is described. Ultraviolet light absorption curves of (I) and its dimethyl ether are given. 2 figures and 19 references. L.E.W.

WOOD OPERATIONS

BERGESTAD, FINN. Logging in Canada. Norsk Skogind. 4, no. 6: 165-7, 169 (June, 1950). [In Norwegian]

Developments in mechanized logging are discussed; although they are not directly applicable to Norwegian forestry, much can be learned from them for developing a form of mechanized logging suitable for conditions in Norway. 2 illustrations. E.S.

WOOD TRANSPORTATION

COLLIER, R. D. Gravity transport of wood by wire. Pulp Paper Mag. Can. 51, no. 7: 138, 142 (June, 1950).

The author discusses improvements in equipment and load attachments, the development of an intermediate support, and production and costs of gravity transport of wood by wire. E.S.

WOOD WASTE

ANON. Improving on nature's wood. Modern Plastics 27, no. 11: 64-6 (July, 1950); *cf.* B.I.P.C. 19: 361.

The raw materials, manufacture, properties, and applications of Prespine (a phenolic resin-bonded wood-waste board) are described. 6 illustrations. E.S.

XYLAN

CHANDA, S. K., HIRST, E. L., JONES, J. K. N., and PERCIVAL, E. G. V. The constitution of xylan from esparto grass (*Stipa tenacissima*, L.). J. Chem. Soc.: 1289-97 (May, 1950).

A xylan containing no arabinose residues has been prepared from esparto grass. After the hydrolysis of its methylated derivative and the chromatographic separations of the products, both on paper strips and on a column of cellulose, it is concluded that the polysaccharide consists of a single-branched molecule containing 75 (±5) D-xylopyranose units, the single branching point being formed by a 1,3-union. This conclusion is supported by the results of oxidation with periodate, and by estimation of the reducing power with 3,5-dinitrosalicylic acid and of molecular weight by the osmotic-pressure method. 6 tables. E.S.

Patent Section

Although the abstracts of the United States patents are prepared from the patents themselves, the initial selection of the patents to be abstracted is made from the Patent Gazette *and, therefore, it is possible that the patent section will not contain all patents of potential interest to the industry. The abstracts of the Canadian patents are prepared from the claims published in the* Canadian Patent Office Record. *In so far as possible, an attempt will be made to indicate patents issued in both countries.*

The patent abstracts are listed under the various headings currently used for the abstracts of periodical articles.

Printed copies of United States patents can be obtained from the Commissioner of Patents, Washington, D.C.; the price is 25 cents per copy. Canadian patents up to and including December, 1948, are available only as manuscripts or photostatic copies and an estimate of the cost of a patent should be obtained from the Commissioner of Patents, Ottawa, Canada, in advance of the order. With January, 1949, printed copies of Canadian patents are available at 25 cents per copy of less than 50 sheets of printed matter. For patents of 50 sheets or over, the price is $1.00 per copy. Until the printing branch is in full operation and up to date, the printing of specifications will be several months behind.

BLACK LIQUOR

BERGSTRÖM, HILDING O. V., and TROBECK, KARL G. Process of utilizing waste liquors. Canadian patent 466,610. Filed May 26, 1943. Issued July 18, 1950. 9 claims.

A process of utilizing black liquor includes at least a two-stage evaporation of the liquor; the concentration of the liquor in the last step is conducted at superatmospheric pressures and is continued to a solids content of 80-95%, so that the liquor will be in the solid state at normal temperatures; the liquor is then sprayed to the atmosphere at 180-220° C., and a dry, porous product is obtained. E.G.S.

BLEACHING

BURLING, ELMER R., and RICH, JOHN P. Method and apparatus for chemical treatment. U. S. patent 2,516,447. Filed Feb. 24, 1947. Issued July 25, 1950. 10 claims. [Cl. 8-156]

A pulp bleacher is equipped with positive radial impeller arms which continuously and positively move the stock radially outward; the stock which is moved in this manner must necessarily return radially inward. The result is a constant radial interchange of stock between the center and the periphery; the net effect is an equalization between the center and the periphery of the time required for the average fiber to travel the length of the tower. E.G.S.

DAY, GEORGE A., and HOOS, BENJAMIN G. Bleaching treatment for cellulosic materials. U. S. patent 2,513,787. Filed Jan. 31, 1947. Issued July 4, 1950. 6 claims. Assigned to Brown Company. [Cl. 8-105]

This is similar to Canadian patent 460,243; *cf.* B.I.P.C. 20: 213. E.G.S.

BLEACHING—GROUNDWOOD

ADAMS, DANIEL O., and HUGHEY, GEORGE B. Hypochlorite bleaching of ground wood. U. S. patent 2,516,664. Filed Oct. 16, 1944. Issued July 25, 1950. 5 claims. Assigned to West Virginia Pulp and Paper Company. [Cl. 8-105]

This is the same as Canadian patent 462,416; *cf.* B.I.P.C. 20: 441.
E.G.S.

MCEWEN, ROBERT L. Method of bleaching high-density pulp. U. S. patent 2,513,344. Filed Sept. 19, 1946. Issued July 4, 1950. 6 claims. Assigned to Buffalo Electro-Chemical Company, Inc. [Cl. 8-104]

A method of bleaching a high-density (i.e., 18-35% consistency) groundwood pulp comprises the steps of preparing a wet lap from the pulp, wetting the lap with an alkaline peroxide bleaching solution, immediately passing the impregnated lap to a disintegrator, permitting the disintegrated lap to bleach in the damp condition, and then diluting and neutralizing the pulp for use on the papermaking machine. E.G.S.

MCEWEN, ROBERT L., and SHELDON, FRED R. Method of bleaching moist felted groundwood pulp. U. S. patent 2,514,503. Filed July 30, 1947. Issued July 11, 1950. 2 claims. Assigned to Buffalo Electro-Chemical Company, Inc. [Cl. 8-104]

The bleaching or brightening of groundwood, pretreated groundwood, and semichemical pulps is accomplished with an alkaline peroxide solution. The moist felted pulp is impregnated with the peroxide solution in any suitable manner, such as by padding or spraying. The bleach solution is preferably padded on the moist, high-density, felted pulp or lap by applicator rolls as it leaves the vacuum thickener, feltless wet machine, or other dewatering apparatus. The amount of bleach solution added is insufficient to reduce the pulp consistency materially but is sufficient to permeate the pulp. Following the application of the bleach solution, the impregnated pulp is lapped for storage or shipment. In the lapped condition the impregnated pulp has a substantial volume and a relatively small exposed area, so that no significant evaporation or temperature change is likely to take place. The impregnated lap can be stored or be in shipment for any reasonable period of time. During storage or shipment the bleaching reaction takes place; the presence of the residual bleaching chemicals is not detrimental to the brightness stability. At any time after maximum brightness has been reached, the impregnated pulp can be added directly to the other paper furnish constituents without further treatment or processing. E.G.S.

BLEACHING—SULFATE

DAY, GEORGE A., and HOOS, BENJAMIN G. Bleaching of sulfate wood pulp. U. S. patent 2,513,788. Filed Jan. 31, 1947. Issued July 4, 1950. 1 claim. Assigned to Brown Company. [Cl. 8-106]

A process of bleaching sulfate pulp comprises the successive treatment of the pulp, without intervening washing, with hypochlorite and chlorine (the hypochlorite represents 20-50% of the total equivalent chlorine input of the process); digestion of the pulp with caustic soda at 140-210° F.; and treat-

ment of the stock with chlorine dioxide. The final step is carried out at 140° or above, at a stock consistency of 4%, and at a pH of 5-7. E.G.S.

BOARD

ABRAHAM, HERBERT. Composition board. U. S. patent 2,514,021. Filed March 13, 1948. Issued July 4, 1950. 5 claims. Assigned to The Ruberoid Co. [Cl. 106-93]

A nonwarping composition board comprises a sheet of set hydraulic cement which contains 86.5% portland cement, 3.5% asbestos fiber (7D grade), 7% sulfate cellulose fiber, and 3% asphalt. E.G.S.

BOARD SPECIALTIES

CRONQUIST, NILS R. Display card. U. S. patent 2,513,456. Filed Dec. 6, 1945. Issued July 4, 1950. 1 claim. Assigned to Universal Bulb Corporation. [Cl. 40-124.1]

A display card is formed from a single cardboard blank which is folded and secured to provide horizontal parallel flanges which may be slidably inserted into a counter box ticket holder. The name of an article and its price may be included on the face of the card. E.G.S.

FORRER, HOMER W. Bottle carrier. Canadian patents 466,497 and 466,498. Filed Oct. 28, 1949. Issued July 11, 1950. 14 and 9 claims. Assigned to Atlanta Paper Company.

The bottom wall panel of a collapsible bottle carrier is formed with a medial fold line which adapts it to be folded inwardly between two side wall panels in collapsing the carrier. E.G.S.

FREDERICK, EMILE, JR. Concrete form lining. U. S. patent 2,514,484. Filed March 12, 1942. Issued July 11, 1950. 7 claims. Assigned to The Celotex Corporation. [Cl. 154-45.9]

A composite concrete form-lining material consists of a sheet of fiber insulating board, on one surface of which is mounted a sheet of porous paper; the paper is preferably unsized and has an air porosity of 2-6 seconds per 100 cc., in accordance with A.S.T.M. Tentative Method D 202-32 T. The paper is adhered to the board with a water-soluble glue which is used sparingly; limited adhesion is provided by spot, strip, or line gluing, as is commonly practiced in gluing operations. E.G.S.

GRAY, HARRY Z. Carton carrier. U. S. patent 2,514,858. Filed March 3, 1948. Issued July 11, 1950. 7 claims. [Cl. 294-87.2]

A cardboard carrier is designed to hold three paperboard milk containers. The carrier is formed with spaced, cutout portions and adjacent tongues; the cutout areas are adapted to receive the projecting ends of the container tops, and the tongues fit into the lateral openings at the tops of the containers. E.G.S.

HOLTZMAN, MAITEH M., and ALTEN, LILLIAN. Surprise gift box. U. S. patent 2,516,003. Filed Jan. 24, 1947. Issued July 18, 1950. 4 claims. [Cl. 40-86]

A gift box incorporates a paper web which can be wound from one roller

to another until a single predetermined window portion overlies a packaged article. E.G.S.

KOERBER, CHARLES F. Bottle carrier. U. S. patent 2,513,495. Filed April 11, 1949. Issued July 4, 1950. 12 claims. [Cl. 224-45]

A bottle carrier is formed from a scored and folded cardboard blank and incorporates a tab at an intermediate portion which is adapted to interlock with an end portion of the blank to define a bottle-receiving socket portion. The interlocking parts are arranged to be engaged by a bottle and retained against release. E.G.S.

KORNFELD, WILLIAM F., and NAGLE, WILLIAM S. Portable bottle refrigerator carton. U. S. patent 2,514,651. Filed March 20, 1947. Issued July 11, 1950. 3 claims. [Cl. 62-91.5]

A portable bottle cooler or refrigerator comprises a paperboard shell which has side walls and a square bottom and which defines the refrigerator chamber; removable side wall and bottom wall insulator inserts made of corrugated paperboard; a collapsible, removable, vented paperboard refrigerant receptacle which is adapted for insertion in the center of the refrigerator chamber; a moisture- and gas-impervious bag which is adapted to hold a sublimable or meltable refrigerant within the refrigerant receptacle; a cover for the refrigerator chamber which frictionally engages the shell; and a cord carrying handle. E.G.S.

MAGILL, DONALD G. Method of producing fibre tubing. Canadian patent 466,288. Filed Nov. 17, 1947. Issued July 4, 1950. 11 claims. Assigned to American Can Company.

A method of producing the fiber tubing from which containers are made comprises the steps of applying a fluid, adhesive-treating material (e.g., a mineral oil) to the edge of a single-ply web; winding the web over a tube-forming mandrel to form an inner layer of sheet material with overlapped inner seams; and spirally winding additional layers of the material over the inner layer. All layers are bonded together with an adhesive; the mineral oil serves to prevent the adhesion of the tubing to the mandrel at the seams, where extruded adhesive material might appear. E.G.S.

MOORE, GEORGE A. Display box. U. S. patent 2,515,887. Filed Sept. 5, 1945. Issued July 18, 1950. 3 claims. Assigned to National Biscuit Company. [Cl. 206-45.26]

A display and shipping box is constructed from an integral blank and incorporates locking means that can be engaged in one operation to form a rigid structure. E.G.S.

MUELLER, HARRY E. Bottle carrier. U. S. patent 2,514,252. Filed May 31, 1946. Issued July 4, 1950. 1 claim. [Cl. 294-87.28; changed to 294-87.22]

A cardboard carrier for beverage and milk bottles is provided with a rectangular base, within which three oblong openings are arranged in transverse formation. Hinged flaps are cemented to each longitudinal edge of the base and are designed to engage the bottles in the operative position. The carrier is also equipped with a cord handle. E.G.S.

TYSON, JAMES D., JR. Article carrier. U. S. patent 2,513,762. Filed April 6, 1948. Issued July 4, 1950. 2 claims. Assigned to Tyson-Caffey Corporation. [Cl. 224-48]

A cardboard carrier is designed to support a number of soft drink cups or ice cream cones and may be carried in one hand. E.G.S.

CELLULOSE ETHERS

LAMBORN, BAYARD T. Manufacture of carboxyalkyl cellulose. U. S. patent 2,513,807. Filed June 4, 1948. Issued July 4, 1950. 13 claims. Assigned to Hercules Powder Company. [Cl. 260-232]

A process for recovering the free acid form of carboxymethylcellulose in a purified state comprises the steps of adjusting the pH of a crude etherification reaction mixture containing a salt of carboxymethylcellulose, by-product salts, residual reactants, and water to a value less than 7; drying to a moisture content less than 5% by weight; treating the dried crude reaction mixture with water adjusted to a pH of less than 3.0 for a period of time sufficient to render the carboxymethylcellulose insoluble in water; and then washing the carboxymethylcellulose with water until free of contaminating salts. E.G.S.

CHLORINE DIOXIDE

RAPSON, WILLIAM H., and WAYMAN, MORRIS. Method and apparatus for producing chlorine dioxide. Canadian patent 466,815. Filed April 5, 1946. Issued July 25, 1950. 8 claims. Assigned to Canadian International Paper Company.

This is the same as U. S. patent 2,481,240; *cf.* B.I.P.C. 20: 138. E.G.S.

RAPSON, WILLIAM H., and WAYMAN, MORRIS. Method for removing chlorine from mixtures containing chlorine dioxide and chlorine. Canadian patent 466,816. Filed April 5, 1946. Issued July 25, 1950. 9 claims. Assigned to Canadian International Paper Company.

This is the same as U. S. patent 2,481,241; *cf.* B.I.P.C. 20: 139. E.G.S.

DISPENSING CONTAINERS

LETSCH, CARL H. Dispensing or sifting package. U. S. patent 2,516,471. Filed Oct. 29, 1948. Issued July 25, 1950. 2 claims. [Cl. 222-189; changed to 209-357]

A dispensing package or container for dry, granular, or pulverulent materials (e.g., sugar, flour, water-base paints, plaster, and the like) is provided with a covering which is applied by the manufacturer or packer during the initial sealing operation, and which is adapted to be torn off by the consumer to expose a fabric, metal, or plastic screen over the dispensing opening. E.G.S.

FOLDING BOXES

BERGSTEIN, SAMUEL. Method of making knockdown, hinged lid cartons. U. S. patent 2,515,327. Filed Sept. 9, 1944. Issued July 18, 1950. 7 claims. Assigned to Robert M. Bergstein and Frank D. Bergstein. [Cl. 93-49]

A knockdown carton incorporates a preformed, hinged lid which can be readily opened and reclosed. The carton may be shipped flat and erected by the user. E.G.S.

FEIGELMAN, HERMAN A. Folding box. U. S. patent 2,514,381. Filed July 11, 1946. Issued July 11, 1950. 9 claims. [Cl. 229-27]

A collapsible carton or box is used for holding pencils, pens, crayons, and the like; a section of the carton is inwardly foldable to provide three slots or grooves in which the pencils or the like are held securely when placed therein. E.G.S.

FRANKENSTEIN, WILLIAM P. Carton. U. S. patent 2,514,384. Filed May 7, 1945. Issued July 11, 1950. 8 claims. [Cl. 229-32]

A knockdown carton and its lid are provided with flanges which extend beyond the carton walls at the base of the carton and at the upper end of the lid. Means are included for preventing the wall and extending flanges from being inadvertently released. E.G.S.

GUYER, REYNOLDS. Method and apparatus for forming cartons. U. S. patent 2,516,624. Filed Nov. 6, 1944. Issued July 25, 1950. 16 claims. Assigned to Waldorf Paper Products Company. [Cl. 93-51]

A carton is provided with locking tabs on two opposite side walls which are designed to engage in co-operating slots on the two remaining side walls. During the folding operation of the side walls, the locking tabs are automatically inserted into their respective slots; thus a locked carton is produced in a single operation. E.G.S.

KARLSON, KARL R. Waterproof flexible folding container. U. S. patent 2,514,073. Filed Nov. 16, 1945. Issued July 4, 1950. 1 claim. Assigned to Reynolds Metals Company. [Cl. 220-26; changed to 229-26]

A folding waterproof container is made from a unitary, unnotched, seamless, flexible sheet of material, e.g., a lightweight, laminated kraft paper which may be bonded together with a waterproof adhesive, a laminated foil and paper, or a waterproof fabric. E.G.S.

MUNTZ, HAROLD F. Food carton. Canadian patent 466,360. Filed Nov. 16, 1942. Issued July 4, 1950. 2 claims. Assigned to Kellogg Company.

A small, individual-serving, paperboard cereal package is provided with a water-resistant paper liner, so that milk or cream may be added to the dry cereal in the package, and the receptacle may thus serve as a bowl. E.G.S.

TYRSECK, WALTER J. Carton. U. S. patent 2,513,902. Filed Nov. 30, 1948. Issued July 4, 1950. 4 claims. Assigned to Robertson Paper Box Co., Inc. [Cl. 229-14]

A shockproof or cushioned receptacle for bottles or similar articles may be constructed from pasteboard on existing automatic machinery; the con-

tainer is designed for manufacture on a continuous roll-around principle. E.G.S.

VAN ROSEN, ROBERT. Carton. U. S. patent 2,515,026. Filed March 26, 1947. Issued July 11, 1950. 5 claims. Assigned to J. Makowsky Corporation. [Cl. 229-22]

A cardboard carton is described which has a triangular cross section and which may be used as a closed container or a display device. One or more of the walls of the device may be provided with an opening or window which may be opened or closed with a transparent insert or cover. One wall may be extended beyond the apex of the triangle to form a handle or an enlarged display background. E.G.S.

WILSON, JOHN W. Lined carton. U. S. patent 2,516,820. Filed Dec. 26, 1946. Issued July 25, 1950. 6 claims. Assigned to Interstate Folding Box Company. [Cl. 229-14]

A four-panel carton for the packaging of foodstuffs is provided with a bag-type liner; the parts of the structure are arranged so that the liner is squared up and opened for filling when the carton is erected. E.G.S.

FOLDING BOXES, SIFTPROOF

WILLIAMSON, MARSHALL I. Container. U. S. patent 2,516,085. Filed Feb. 14, 1945. Issued July 18, 1950. 8 claims. Assigned to National Folding Box Company. [Cl. 229-37]

A method is described for making and sealing a leak- and siftproof container. A carton blank having end flaps is arranged to form corner-sealing webs between adjacent end flaps; the webs may be formed either by a liner or a strip of material extending beyond the scorelines of the end flaps. E.G.S.

INTERIOR PACKING

BERGERON, ERNEST J. Corner protector for enclosed bodies. U. S. patent 2,514,833. Filed Jan. 26, 1948. Issued July 11, 1950. 6 claims. [Cl. 229-1.5]

A protective corner unit for bodies within a container may be folded into protector form from a blank of single-wall corrugated paperboard stock; the unit is self-locking in response to the final folding of a unit wall. E.G.S.

MACHINERY—BOARD MACHINES

VICK, EDWARD H. Manufacture of fibre board and the like. Canadian patent 466,313. Filed July 4, 1947. Issued July 4, 1950. 9 claims. Assigned to E. A. Chamberlain Limited.

An apparatus for the manufacture of fiberboard comprises a continuously operating boardmaking machine for the production of separate sheets of wet board in succession, an intermittently operated platen press, and a conveyor for the delivery of the wet board from the machine to the press. E.G.S.

MACHINERY—CALENDERS

PUTNAM, CHARLES P. Calender machine. Canadian patent

466,855. Filed Jan. 20, 1949. Issued July 25, 1950. 9 claims. Assigned to New York and Pennsylvania Co., Inc.

A calender machine includes a pair of soft calender rolls which are swingably mounted on diametrically opposed sides of a first-pass pressure roll for selective nip engagement with a corresponding first-path lower driver roll, and a second pair of soft calender rolls which are swingably mounted on separate radial sides of a second-pass lower driver roll for selective nip engagement with a corresponding second-pass pressure roll. E.G.S.

MACHINERY—CONVERTING MACHINERY

HUNDLEY, ROBERT R. Taping means for carton folders. U. S. patent 2,513,647. Filed June 28, 1948. Issued July 4, 1950. 2 claims. Assigned to Old Dominion Box Company. [Cl. 93-56]

A taping mechanism is used in conjunction with a carton-folding machine; the device may be adjusted to align the tape properly with the junction line of the opposed edges of a folded carton blank. E.G.S.

SHIELDS, ALBERT F. Folding machine. Canadian patent 466,587. Filed Dec. 10, 1947. Issued July 11, 1950. 3 claims. Assigned to S & S Corrugated Paper Machinery Co., Inc.

A folding machine is adapted for the formation of flat, collapsed, tubular box blanks from flat, scored sheets. E.G.S.

MACHINERY—CRIMPING MACHINE

SAPP, GERALD G. Paper crimper and stacker. U. S. patent 2,514,801. Filed Sept. 13, 1948. Issued July 11, 1950. 15 claims. [Cl. 154-30]

A machine is adapted for crimping a continuous strip of paper or other material, such as sheet metal, cardboard, or the like. The mechanism operates automatically to receive a continuous strip of material at one end, convey the strip from a supply roll or drum, simultaneously form folds in the strip, and stack the folded strip in a die or box at the other end. E.G.S.

MACHINERY—CURLATOR

HILL, HAROLD S., and EDWARDS, JOSEPH. Mechanically curling cellulose fibers. U. S. patents 2,516,384. Filed Jan. 15, 1942. Issued July 25, 1950. 6 claims. [Cl. 92-20]

A method of mechanically curling pulp fibers includes the steps of dewatering and agitating the stock until the pulp is worked into small, moist, discrete, crumblike nodules in which the fibers are randomly intertwined; compressing the nodules in a relatively thin layer between opposed working surfaces; causing the nodules, while under compression, to be reoriented repeatedly with reference to the direction of compression; and then adding water to the nodules to rework the pulp into an aqueous suspension of fibers. E.G.S.

MACHINERY—DRIVE

HORNBOSTEL, LLOYD. Differential drive. U. S. patent 2,514,240. Filed May 27, 1946. Issued July 4, 1950. 3 claims. Assigned to Beloit Iron Works. [Cl. 74-675]

The transmission of power from a main line shaft to any of the rotating sections of a papermaking machine is accomplished without requiring adjustable pulley and belt arrangements for transmitting a majority of the power. The apparatus also eliminates the necessity for separate right-angle gear units. E.G.S.

MACHINERY—FELTS

PORRITT, OLIVER W., and SHAW, WILLIAM S. Woven textile fabrics or felts. Canadian patent 466,866. Filed Nov. 13, 1947. Issued July 25, 1950. 16 claims. Assigned to Porritts & Spencer Limited.

A papermaker's felt comprises an endless web of woven fabric whose transverse yarns are formed completely of nylon, and whose longitudinal yarns are composed of staple fibers, which consist of nylon fibers and up to 30% of other fibers. E.G.S.

MACHINERY—FOLDING MACHINE

ANDERSON, IVAN G. Coupling means for folding rolls. U. S. patent 2,514,737. Filed April 8, 1948. Issued July 11, 1950. 1 claim. [Cl. 270-80]

The coupling means for adjustable paper-folding rolls includes a number of gear sets of different size which are permanently associated with the rolls and which are arranged so that only one gear set at a time may be rendered operative to couple the rolls. E.G.S.

MACHINERY—HEAD BOX

GOUMENIOUK, GLEB I. Stock inlet. Canadian patent 466,720. Filed Feb. 11, 1948. Issued July 18, 1950. 18 claims. Assigned to Powell River Company Limited.

A stock inlet for papermaking machines comprises a closed pond chamber, a deceleration section which extends upward to one side of a chamber, an acceleration section which extends downward to the opposite side of the chamber, a slice at the lower end of the acceleration section, and the means for supplying stock to the lower end of the deceleration section. E.G.S.

MACHINERY—JORDANS

JONES, DWIGHT E. Jordan plug. U. S. patent 2,514,547. Filed Sept. 27, 1945. Issued July 11, 1950. 3 claims. Assigned to E. D. Jones & Sons Company. [Cl. 92-27]

The bars or knives of a jordan plug are supported throughout their entire length and are secured to the plug by circumferential windings of wire or the like which interlock with longitudinally spaced circumferential grooves in the body of the plug. E.G.S.

MACHINERY—PACKAGING MACHINERY

DODGE, WESLEY. Vegetable packing machinery. U. S. patent 2,513,459. Filed July 27, 1946. Issued July 4, 1950. 4 claims. [Cl. 93-5]

A vegetable packaging machine includes a delivery conveyor which advances intermittently to deposit an article to be wrapped at a wrapping station. A wrapper sheet (e.g., vegetable parchment, cellophane, or the like)

is removed from a roll of the material, drawn into position at the wrapping station, and severed from the roll. The article is deposited on the wrapper, and the two are forced downward through a confining passageway, thus drawing the wrapper up and around the article. The extending ends of the wrapper are then brought together and secured with a wire staple. The machine is adapted for the wrapping of articles of comparatively irregular size and shape, such as lettuce, cabbage, cauliflower, oranges, lemons, apples, and the like. E.G.S.

NEWBY, WILLIAM G., SR. Coin-wrapping device and means. U. S. patent 2,515,312. Filed June 15, 1948. Issued July 18, 1950. 1 claim. [Cl. 93-2]

A gaging board is designed to facilitate the packaging of a predetermined number of coins in a specially constructed paper wrapper. E.G.S.

RUMSEY, HERBERT, JR. Wrapping and twisting machine. U. S. patent 2,514,293. Filed July 27, 1948. Issued July 4, 1950. 4 claims. [Cl. 93-5]

A wrapping or twisting machine is adapted for the packaging of articles in various types of sheet materials, e.g., the application of an outer wrapping to a package or the casing to a food product. The device may be used with various synthetic plastic sheet materials such as cellulose acetate, cellophane, vinyl resin films, saran, Pliofilm, and the like, as well as with paper and natural casings. E.G.S.

MACHINERY—PASTING MACHINE

WILLBRANDT, FRANKLIN M. Carton sealing machine. U. S. patent 2,515,620. Filed Sept. 15, 1947. Issued July 18, 1950. 4 claims. Assigned to Battle Creek Bread Wrapping Machine Company. [Cl. 93-2]

A semiautomatic sealing machine is adapted for the rapid closing and sealing of food cartons and liner bags which are positioned within the cartons. The machine is adjustable to accommodate cartons of different sizes. E.G.S.

MACHINERY—PRESSES

CHAPMAN, RALPH. Forming press with loader and unloader. Canadian patent 466,822. Filed June 24, 1948. Issued July 25, 1950. 11 claims. Assigned to Chapman Forest Utilization, Inc.

A hot press for forming artificial boards comprises a platen, a face plate suspended from the platen, and a screen movably mounted on the platen; a pair of endless sprocket chains is mounted on the platen and is attached to the ends of the screen; the upper and lower flights of the chain are adjacent to the upper and lower edges, respectively, of the side wall of the platen; face plate-supporting brackets are mounted on the sides of the platen and extend around the lower flights of the chains. E.G.S.

MACHINERY—PULPERS

STAPLEY, STEPHEN G., and SUBART, WILLIAM. Pulping machine. Canadian patent 466,359. Filed April 1, 1948. Issued July 4, 1950. 9 claims. Assigned to E. D. Jones & Sons Company.

This is a modification of the Stapley pulper, which was covered by U. S. patent 2,433,490 (Dec. 30, 1947) and Canadian patent 457,312 (June 14, 1949; *cf.* B.I.P.C. 19:825); *cf.* also B.I.P.C. 17:491. E.G.S.

MACHINERY—SCREENS

JÖNSSON, NILS W. Apparatus for screening fibrous suspensions. U. S. patent 2,514,159. Filed May 3, 1945. Issued July 4, 1950. 2 claims. [Cl. 92-34; changed to 92-35]

The screen is rotated to subject the pulp fibers to a centrifugal motion; simultaneously the stock is moved centripetally, that is, from the outside inward. In this manner clogging of the screen plates is avoided, and a high screening efficiency is obtained. E.G.S.

MACHINERY—SLITTERS AND WINDERS

DICKHAUT, CHARLES A. Web delivery. Canadian patent 466,422. Filed Dec. 10, 1947. Issued July 4, 1950. 12 claims. Assigned to John Waldron Corporation.

A web-winding machine incorporates a winding drum over which a web passes and a core on which the web is wound into a roll by peripheral contact with the winding drum. The core is journalled in movably mounted bearings which may be moved away from the winding drum as the diameter of the wound roll increases. E.G.S.

MACHINERY—STRIPPING MACHINE

WILLBRANDT, FRANKLIN M. Stripping mechanism for carton forming machines. U. S. patent 2,515,621. Filed Jan. 26, 1948. Issued July 18, 1950. 11 claims. Assigned to Battle Creek Bread Wrapping Machine Company. [Cl. 93-51; changed to 93-36]

A provision is made for a carton-stripping mechanism which will advance with the forming blocks of a carton-forming machine so that the cartons can be stripped from the blocks without stopping the forming mechanism of the machine. E.G.S.

MOLDED PULP ARTICLES

CHAPLIN, MERLE P. Method of manufacturing moulded pulp articles. Canadian patent 466,672. Filed April 13, 1949. Issued July 18, 1950. 4 claims. Assigned to Chaplin Corporation.

This is the same as U. S. patent 2,494,743; *cf.* B.I.P.C. 20:452. E.G.S.

CHAPLIN, MERLE P. Method of producing molded fiber articles. U. S. patent 2,515,113. Filed Dec. 17, 1943. Issued July 11, 1950. 7 claims. Assigned to Chaplin Corporation. [Cl. 92-54]

A molded pulp egg carton incorporates a hinge as an integral part of the structure. The hinge area is rendered relatively strong and durable by compacting and drying between heated dies. E.G.S.

CHAPMAN, RALPH. White water tower and method of forming pulp articles. Canadian patent 466,821. Filed June 24, 1948. Issued July 25, 1950. 18 claims. Assigned to Chapman Forest Utilization, Inc.

A method of forming artificial boards comprises the steps of forming an aqueous slurry of pulp, segregating successive batches of the slurry, and discharging each batch of slurry while turbulently adding the liquid drained from a preceding batch. E.G.S.

PAPER—COATED

BARRETT, WILLIAM H., and ASDELL, BERNARD K. Apparatus for coating paper. U. S. patent 2,513,394. Filed May 24, 1945. Issued July 4, 1950. 7 claims. Assigned to Minnesota and Ontario Paper Company. [Cl. 91-49]

This is similar to Canadian patent 453,300; *cf.* B.I.P.C. 19:371. E.G.S.

FISHER, HARRY C., and SOOY, BRAINARD E. Coated paperboard and method of making same. U. S. patent 2,515,340. Filed April 1, 1947. Issued July 18, 1950. 18 claims. Assigned to The Gardner Board and Carton Co. [Cl. 117-76]

A process for coating and coloring paper and paperboard is described; the product is rendered resistant to wet rubbing by the application of an imprinted mineral coating. For example, an aqueous solution of one volume of 5% polyvinyl alcohol and four volumes of 6% converted starch is applied to the web on the breaker calender stack. This plasticizable solution is applied in the upper water box and is followed by a reactive resin solution which comprises, e.g., 10 quarts of water, 4 parts of dry urea-formaldehyde powder, and 0.4 part of ammonium chloride, in the middle or lower box. The coating used on the imprinting coater consists of a regular clay coating with a plain starch adhesive and a pigment which contains about 56.8% solids; the film on the imprinting roll is about 0.001 inch thick. The drier rolls which follow the imprinting coater are heated with 18-p.s.i. steam, and the dried, coated board is passed through the finishing calender. E.G.S.

HOLLOWAY, DONALD F., and YOUNG, HARLAND H. Coating composition. U. S. patent 2,516,700. Filed Dec. 15, 1945. Issued July 25, 1950. 6 claims. Assigned to Swift & Company. [Cl. 106-146]

A paper coating composition is substantially immune to bacterial decomposition and is capable of practically infinite dilution at a pH of 7 or less without the precipitation of water-insoluble protein. An illustrative composition comprises 25 parts of casein, 25 parts of urea, 45 parts of water, and 1.25 parts of the sodium salt of pentachlorophenol (all on a weight basis). E.G.S.

PAPER SPECIALTIES

ANZALONE, RALPH. Treated paper parachute. U. S. patent 2,516,444. Filed Nov. 17, 1945. Issued July 25, 1950. 1 claim. Assigned to Leonard P. Frieder. [Cl. 244-145]

A treated paper parachute is designed for use in conjunction with pyrotechnic flares, signals, and the like. The paper canopy is protected against drying out and a consequent loss in strength by impregnation with a solution which consists of 1-4.5 parts of glycerine and 100 parts of commercial-grade ethyl alcohol. Excess impregnating fluid is removed by squeegeeing or centrifuging, and the alcohol is evaporated from the paper. E.G.S.

BAXTER, THOMAS R. Infusion package and method of making

same. Canadian patent 466,876. Filed May 18, 1943. Issued July 25, 1950. 10 claims. Assigned to Standard Brands Incorporated.

This is the same as U. S. patent 2,498,197; *cf.* B.I.P.C. 20:615. E.G.S.

BELCHER, DANIEL. Method of proofing laminated material. U. S. patent 2,513,708. Filed Nov. 12, 1943. Issued July 4, 1950. 3 claims. Assogned to Bemis Bro. Bag Company. [Cl. 154-142; changed to 154-138]

A method is described for proofing composite or multi-ply paper webs which incorporate asphalt as a laminant. According to the invention, a composite web is led into a spray or atomizing chamber, in which spray heads are located for spraying atomized liquid wax on opposite sides of the web. The heads may be of the type used in liquid spray guns. The wax is piped into the heads from a wax melting tank and is maintained in a hot, molten condition from the time it leaves the tank until it is deposited on the web. The wax which is used may be any suitable amorphous or crystalline wax. E.G.S.

FLEISCHER, NATHAN I. Detachable marking tag. U. S. patent 2,514,127. Filed March 2, 1949. Issued July 4, 1950. 3 claims. Assigned to The Fleischer Mills, Inc. [Cl. 40-20; changed to 40-2]

A detachable laundry marking tag is fabricated from a strip of wet-strength paper or fabric; one end of the tag is twice folded upon itself to provide an open-ended attachment pocket into which the edge of an article to be identified may be inserted and secured by means of a wire staple. E.G.S.

HICKERNELL, LATIMER F. Composite sheet. Canadian patent 466,496. Filed Feb. 11, 1948. Issued July 11, 1950. 1 claim. Assigned to Anaconda Wire and Cable Company.

This is the same as U. S. patent 2,498,493; *cf.* B.I.P.C. 20:616. E.G.S.

KANTROWITZ, MORRIS S., and GOSNELL, EARL J. Water-detecting paper and a water-detecting coating composition therefor. U. S. patent 2,515,232. Filed Dec. 31, 1946. Issued July 18, 1950. 9 claims. [Cl. 106-171]

A water-detecting stationery is treated with a composition which consists of finely divided Lithasol brilliant blue E uniformly blended with an approximately equal amount of No. 3 lithographic varnish; the blend is dispersed in a solution of ethylcellulose and ethyl acetate. The stationery will expose attempts to write thereon with invisible inks and will be substantially unaffected by humidity. E.G.S.

PIAZZE, THOMAS E. Article of manufacture and method. U. S. patent 2,514,255. Filed March 1, 1945. Issued July 4, 1950. 8 claims. Assigned to Shellmar Products Corporation. [Cl. 206-48.5]

A tobacco pouch is fabricated from a heat-sealable web (e.g., Pliofilm or lacquered cellophane) which is laminated to an outer protective sheet (e.g., kraft paper, foil, or the like) by means of an amorphous or microcrystalline wax. The composite wrapper is folded in such a manner that the heat-sealable material provides the inner liner of the pouch. E.G.S.

SIMPSON, WILLIAM. Parcel bag. U. S. patent 2,516,266. Filed May 22, 1948. Issued July 25, 1950. 3 claims. Assigned to Cohoes Envelope Company, Inc. [Cl. 229-54]

A paper parcel bag is constructed so that the handle members on the front and back walls of the bag are located opposite to each other, with their finger openings in register, so that when the closure flap is folded over the bag mouth, it is held in folded position by one of the handle members. The bag may be locked closed by inserting the locking tongue of one handle member through the registering finger opening of the other. E.G.S.

STRICKLAND, VERNON D. Bread wrapper. Canadian patent 466,869. Filed March 10, 1949. Issued July 25, 1950. 4 claims. Assigned to E. S. & A. Robinson (Canada) Limited.

A bread wrapper comprises a rectangular, laminated, multi-ply, flexible main body portion which forms the sides of the wrapper, and two single-ply, flexible side marginal portions which extend from the opposite parallel edges of the body portion to form the end portions of the wrapper. E.G.S.

WOODWARD, ROBERT N. Sized paper. U. S. patent 2,514,689. Filed Nov. 7, 1946. Issued July 11, 1950. 3 claims. Assigned to Eastman Kodak Company. [Cl. 117-155]

A paper which is free from frilling when used for photographic purposes results from the tub sizing of a waterleaf, high α-cellulose paper with a composition consisting of a 1-8% aqueous starch solution, 10-50% (based on the weight of the starch) of a water-soluble, wet strength-imparting, melamine-formaldehyde resin, and sufficient citric acid to adjust the pH of the solution to 3-5. E.G.S.

PHYSICAL TESTING—PAPER—SIZE RESISTANCE

WRIGHT, ALAN V. Instrument for use in the control of paper making. Canadian patent 466,557. Filed May 31, 1947. Issued July 11, 1950. 4 claims. Assigned to Kelvin, Bottomley & Baird Limited.

This is the same as U. S. patent 2,506,478; *cf.* B.I.P.C. 20: 765. E.G.S.

ROSIN

POOR, EDWARD N., and HOWARD, KENNETH L. Stabilization of rosin sizes. Canadian patent 466,792. Filed Feb. 18, 1946. Issued July 25, 1950. 6 claims. Assigned to American Cyanamid Company.

This corresponds to U. S. patent 2,438,096; *cf.* B.I.P.C. 18: 646. E.G.S.

SHIPPING CONTAINERS

BELSINGER, JACK R. Easy packing container. U. S. patent 2,512,539. Filed Oct. 19, 1948. Issued June 20, 1950. 1 claim. Assigned to Belsinger, Inc. [Cl. 229-6]

A relatively large shipping container for cones of rayon yarn includes a liner which extends throughout the length of the container and two outer sleeve sections which telescope over opposite ends of the liner and abut one

another at about the midpoint of the liner. This is a division of U. S. patent 2,453,614; *cf.* B.I.P.C. 19: 374. E.G.S.

CRANE, WALTON B. Container. U. S. patent 2,515,151. Filed Jan. 26, 1946. Issued July 11, 1950. 2 claims. Assigned to Alpak. [Cl. 229-28]

The transverse partitions of a multicompartment paperboard container for jars or bottles are automatically erected and held in position by means of a longitudinal partition. E.G.S.

KISHIBAY, CHARLES O. Shipping carton for sensitive electrical instruments. U. S. patent 2,516,124. Filed Feb. 27, 1946. Issued July 25, 1950. 8 claims. [Cl. 206-46]

A shipping carton is designed to protect sensitive electrical instruments from damage due to vibrations and shocks encountered in transit. The carton comprises a pair of inner and outer telescoping cardboard boxes. The outer box is an ordinary double-walled cardboard box with a corrugated filler between the walls; the inner box comprises two box sections which are constructed so that one section will telescope within the other. The two box sections are sealed together by a wide band of adhesive material, which is adhered along one center line of the inner section and which extends upward at either end along the side walls of the outer section. E.G.S.

NUGENT, EUGENE J. Box. U. S. patent 2,514,587. Filed Jan. 18, 1945. Issued July 11, 1950. 5 claims. Assigned to California Container Corporation. [Cl. 229-31]

The end walls and the adjacent portions of the side walls of a corrugated box are reinforced to sustain heavy stacking loads; the corners of the container are leakproof. The box is particularly adapted for the shipment and storage of refrigerated perishable foods. E.G.S.

SCURICH, STEPHEN, JR. Cushioned packing box. U. S. patent 2,514,295. Filed Nov. 27, 1948. Issued July 4, 1950. 5 claims. [Cl. 229-6]

A fruit packing box has rigid supporting ends and side walls, and if desired, also a cover; the box is formed from a single strip of heavy, bendable, paper sheet material of uniform width; by infolding the sheet, the box is provided with cushion walls, and the thermal insulation of the packed fruit is facilitated. E.G.S.

SULFITE WASTE LIQUOR

MELANDER, KARL H. A., SÄVÖ, GÖTE E., and JOHANSON, TAGE I. Treatment of waste sulphite liquor. Canadian patent 466,880. Filed April 26, 1945. Issued July 25, 1950. 7 claims. Assigned to Sulfitaktiebolaget Göta.

This corresponds to U. S. patent 2,445,838; *cf.* B.I.P.C. 18: 886-7. E.G.S.

TALL OIL

GLICK, SANFORD E. Polymerizable styrene-tall oil modified polyester composition. U. S. patent 2,514,389. Filed Nov. 16, 1944.

Issued July 11, 1950. 10 claims. Assigned to Monsanto Chemical Company. [Cl. 260-22]

A polymerizable composition is adapted for the impregnation of porous materials, such as metal castings (e.g., aluminum, magnesium, or iron). In the preparation of the product, a mixture of 336 parts of diethylene glycol, 208 parts of maleic anhydride, and one part of *p*-toluenesulfonic acid monohydrate is heated to 190° C. over a period of 0.5-1 hour and is maintained at that temperature until the acid number of the reaction mixture is reduced to about 5-15; this process requires about 0.5-1.5 hours. Subsequently, 456 parts of tall oil are added, and the heating of the mixture is continued at about 195-205° until the acid number of the reaction mixture is reduced to about 25-35; this phase requires about 2-3 hours. The foregoing reaction is carried out under an air condenser; the evolved water is permitted to escape while carbon dioxide is passed through the agitated reaction mixture. The product is a clear, resinous liquid which has a viscosity of 55-65 poises at 25° (Gardner-Holdt viscometer). In the impregnation of a porous metal such as magnesium, the casting is placed in a vessel which can be evacuated and is then subjected to an absolute pressure of three inches of mercury or less for about 0.5 hour. Then, while a partial vacuum is maintained, a sufficient amount of a mixture of 65 parts of styrene and 35 parts of the resinous product described above is used to cover the casting, and a pressure of 50-90 p.s.i. is applied for about 0.5 hour. The casting is removed from the pressure vessel and, after the removal of the excess impregnating composition by draining and washing with a suitable solvent (e.g., kerosene, toluene, or the like), is baked at 135° for about two hours under a pressure of 75-95 p.s.i., followed by two hours at 150-175° in a circulating air oven. When desired, the impregnating composition may be completely polymerized under pressure by extending the heating period for that operation. The impregnated metal casting is rendered impervious to the passage of hydraulic fluids and the like. The polymerizable styrene-tall oil modified polyester composition is also suitable for the impregnation of textiles, paper, wood, etc., followed by polymerization *in situ*. E.G.S.

JOHNSON, JAMES M., MARK, FRANCIS L., and JELLING, MURRAY. Surface active composition and method of making. U. S. patent 2,514,954. Filed Oct. 31, 1947. Issued July 11, 1950. 8 claims. Assigned to Nostrip Inc. [Cl. 260-97.5; changed to 260-102]

An amidoaminoamine soap is obtained by combining a polyamine containing at least three amino groups (e.g., diethylenetriamine, triethylenetetramine, tetraethylenepentamine, etc.) with an acid mixture of higher fatty acids and rosin acids (e.g., abietic, linoleic, and oleic acids, tall oil, etc.), in the proper proportion to leave at least one amino group of the amine unreacted, and then heating the resulting amine soap at an elevated temperature in order to decompose the soap group of the higher fatty acid and to form an amido group in place of the amino group. The soap of the rosin acid is left in an undecomposed condition. The product is suitable for use as a surface-active agent in bituminous paving compositions. E.G.S.

SMERECHNIAK, JERRY J., and BARLOW, GEORGE W. Method of treating tall oil. U. S. patent 2,515,739. Filed March 6, 1947. Issued July 18, 1950. 3 claims. Assigned to American Cyanamid Company. [Cl. 260-97.7]

A process for treating a composition which contains tall oil fatty acids

to improve its color and odor comprises heating the composition with metallic zinc at 150-275° C.; the amount of zinc used varies from 0.1 to 2.5% by weight, based on the weight of tall oil. E.G.S.

VANILLIN

MARSHALL, HARRY B., and SANKEY, CHARLES A. Method of producing vanillin. U. S. patent 2,516,827. Filed July 23, 1945. Issued July 25, 1950. 5 claims. Assigned to The Ontario Paper Company Limited. [Cl. 252-476; changed to 260-600]

A method is described for the production of vanillin from sulfite waste liquor, as well as from kraft and soda liquor. As an example, one liter of sulfite waste liquor is heated with 100 grams of caustic soda and 16 grams of cupric sulfate pentahydrate in a moderate-pressure reaction bomb. Air is dispersed through the reaction zone, and a relief valve is adjusted to operate at 110 p.s.i.; the reaction time at an observed temperature of 169-170° C. is three hours. At the conclusion of this treatment, the air flow is turned off, the system is cooled to a temperature below its boiling point at atmospheric pressure, and the pressure is reduced to that of the atmosphere by a second relief valve. When the reaction mixture is removed from the bomb, care is taken to remove thoroughly the catalytic sludge of copper oxides and metallic copper by centrifugation. The residual liquor has a vanillin content of 11.5%, based on the original lignin content. The sludge which is recovered from one reaction may be reused as the catalyst in a succeeding reaction, and so on from reaction to reaction. E.G.S.

PEARL, IRWIN A. Production of vanillyl alcohol. Canadian patent 466,881. Filed March 7, 1945. Issued July 25, 1950. 6 claims. Assigned to Sulphite Products Corporation.

Twenty-four parts of sodium hydroxide and 21 parts of catalytic silver are subjected to intense mechanical mixing in 200 parts of water, while a slurry made up of 15.2 parts of vanillin and 50 parts of 37% formalin solution is added gradually. Mixing is continued for about 30 minutes. Since the reaction is exothermic, the temperature of the reaction mixture will rise to near the boiling point. The reaction mass is filtered, acidified with sodium chloride, and extracted with ether to secure 12.7 parts of vanillyl alcohol which is entirely monomeric and unpolymerized and which represents 82.5% of the original vanillin. This is the same as U. S. patent 2,414,120, which was issued Jan. 14, 1947. E.G.S.

WET STRENGTH

MACKINNEY, HERBERT W., and SCHULTZ, SIDNEY J. Manufacture of wet strength paper. Canadian patent 466,298. Filed Nov. 21, 1947. Issued July 4, 1950. 12 claims. Assigned to Bakelite Company (Canada) Limited.

A wet-strength paper is produced by the combination at a pH of 2-12 of a water-soluble urea-formaldehyde (1:3 mole ratio) condensation product with a polyhydric phenol to form a viscous resin which is soluble in aqueous alkaline solutions; the addition of an aqueous alkaline solution of the resin to an aqueous pulp suspension; the acidification of the suspension to precipitate the resin on the paper fibers; the formation of a sheet from the fibers; and the drying of the sheet at an elevated temperature. E.G.S.

Book Review

MOSHER, ROBERT H., ed. Specialty papers, their properties and applications. Brooklyn, Remsen Press, 1950. 520 p.

This volume represents the first attempt to discuss the field of specialty papers. The methods of manufacture of such papers, in general, have been considered "trade secrets," as is evidenced by the few articles which have appeared in the periodical literature. Therefore, it is very gratifying to have a description of these papers by men who are actively engaged in their manufacture. The purpose of the book, as stated by the editor was "to compile the information available on the different products of the specialty paper converting industry, on the raw materials which go into them, on the techniques used in their manufacture, and on the tests used in their evaluation." The scope of the book is shown by the list of types of papers discussed. Gift wraps, fancy box and packaging papers (R. H. Mosher, The Marvellum Co.); decorative papers: shelf and display papers (R. H. Mosher); paper drapes (J. C. Pickering, Jr., Pervel Corp.); wall papers (R. Blakeslee, Imperial Paper and Color Corp.); functional and protective papers: food packaging (J. J. Austin, Austin Industries); metal-parts wrappers (R. H. Mosher); high-gloss specialty papers: flint-glazed papers (R. Blount, Hampden Glazed Card and Paper Co.); friction-glazed papers (R. H. Mosher); brush-enamel papers (F. C. Heywood, The Marvellum Co.); cast-coated papers (R. H. Mosher); miscellaneous decorative papers (R. H. Mosher); marbled papers (R. S. Bracewell, The Marvellum Co.); miscellaneous functional papers (R. H. Mosher); plasticized papers (G. Schmid, Cellutin Corp.); photosensitive papers (C. E. G. Thomson, North Shore Blueprint Co.); cover papers, synthetic leathers, coated tag, and boards (R. H. Mosher, F. A. Barr, The Holyoke Card and Paper Co., and M. A. Park, W. C. Hamilton Co.); asphalt and waterproof papers (M. L. Downs, Thilmany Pulp and Paper Co.); waxed papers (A. M. Worthington, American Tissue Mills); gummed and specialty tapes and labels (F. W. Farrell, McLaurin-Jones Co.); carbon and other duplicating papers (R. R. Wissinger, Copyright Carbon Co.); printing papers (R. H. Simmons, Government Printing Office); films (W. H. Aiken, Goodyear Tire and Rubber Co.); metal-foil papers (J. H. Davies, Standard Rolling Mills, Inc.). The book closes with about a 50-page glossary; many terms were selected from "The dictionary of paper" and others were taken from a glossary of the protective coatings industry compiled by R-B-H Dispersions. The book contains a large mass of information never before compiled and should be very valuable to anyone interested in the field of specialty papers.

C. J. WEST

AUTHOR INDEX TO BOOKS

American Institute of Laundering .. 843
American Society for Testing Materials. *Committee D-9 on Electrical Insulating Materials* 843
American Society for Testing Materials. *Committee D-14 on Adhesives* 843
American Society for Testing Materials. *Committee D-20 on Plastics* 844
Audrieth, L. F., ed. 843
Barnes, G. B. 845
Colmer, A. A. 845
The Council of State Governments. *Committee on Federal Grants-in-Aid* 844
Curtiss, L. F. 844
Dubester, H. J. 845
Fröhlich, H. 843
Immer, Forrest R. 845
Library of Congress. *Descriptive Cataloging Division* 843
Louisiana State University. *Department of Botany, Bacteriology and Plant Pathology* 845
Louisiana State University. *Engineering Experiment Station* 845
McBain, J. W. 843
Moggio, W. A. 845
Niven, W. W., Jr. 843
Northeastern Wood Utilization Council 845
Patterson, A. M. 844
Rensselaer Polytechnic Institute 844
Reynolds, F. E. 843
Ross, S. 844
Sorrell, S. E. 844
U. S. National Bureau of Standards 844
U. S. Office of Education 843
Von Fischer, W., ed. 844
Walden, Sons & Mott, Inc. 845

AUTHOR INDEX TO ABSTRACTS

The letter P preceding a page number indicates a patent abstract.

Abraham, H. .....P 918
Adams, D. O. .....P 917
Adler, E. 907
Aggarwala, J. C. 848
Alpak .....P 930
Alten, L. .....P 918
Alvarez-Nóvoa, J. C. 914
American Can Company .....P 919
American Cyanamid Company .....P 929, P 931
Amidon, G. B. 863
Anaconda Wire and Cable Company .....P 928
Anderson, A. S. 875
Anderson, I. G. .....P 924
Andersson, O. 875, 903
Anzalone, R. .....P 927
Applebaum, S. B. 912
Appling, J. W. 876
Arend, A. G. 878, 901
Aries, R. S. 869
Asdell, B. K. .....P 927
Atkin, S. 859
Atlanta Paper Company .....P 918
Axilrod, B. M. 896
Bailey, A. 870
Bakelite Company (Canada) Limited .....P 932
Barail, L. C. 876
Barker, M. E. 869
Barlow, G. W. .....P 931
Barrett, W. H. .....P 927
Battle Creek Bread Wrapping Machine Company .....P 925, P 926
Baxter, T. R. .....P 927
Bayley, C. H. 856
Bechtel, W. G. 903
Belcher, D. .....P 928
Beloit Iron Works .....P 923
Belsinger, J. R. .....P 929
Belsinger, Inc. .....P 929
Belsterling, C. A. 860
Bemis Bro. Bag Company .....P 928
Bennett, E. 856
Benson, H. K. 907
Bergeron, E. J. .....P 922
Bergestad, F. 915
Bergstein, F. D. .....P 920
Bergstein, R. M. .....P 920
Bergstein, S. .....P 920
Bergström, H. O. V. .....P 918
Bergström, J. 894
Berkman, E. M. 887
Bernet, E. J. 910
Bester, S. 851
Biefer, G. J. 854
Binney and Smith and Ashby, Limited 891
Birchard, W. H. 860
Bland, D. E. 913
Bloodgood, D. E. 853
Bloomquist, W. C. 904
Board of Trade Journal 881
Bone, W. A. 855
Bonner, E. 863
Borgin, K. 856
Bowater, E. 877
Brecht, W. 850, 866
Brett, J. L. 860
Broughton, G. 878
Brown, A. D. 849
Brown, B. F. 852
Brown, G. L. 862
Brown Company .....P 916, P 917
Buckman, S. J. 876
Buffalo Electro-Chemical Company, Inc. .....P 917
Burdsall, J. E. 873
Burling, E. R. .....P 916
Burnett, L. K. 912
Calgon, T. M., Inc. 859
California Container Corporation ...P 930
Calise, V. J. 912
Canadian International Paper Company .....P 920
Carter, H. S. 890
Cash, C. D. 876
The Celotex Corporation .....P 918
Chamberlain, E. A., Limited .....P 922
Chanda, S. K. 915
Chaplin, M. P. .....P 926
Chaplin Corporation .....P 926
Chapman, J. 873
Chapman, R. .....P 925, P 926
Chapman Forest Utilization, Inc .....P 925, P 926
Chester, K. S. 848
Clapperton, W. 846
Clink, G. 912
Cohen, W. E. 868, 892
Cohoes Envelope Company, Inc. ....P 929
Collier, R. D. 915
Connaughton, C. A. 864
Cor. Wfls. 861
Coulter, N. D. 899
Coventry Gauge and Tool Company, Ltd. 893

Cozens, A. A. 879
Craig, F. A. 885
Crane, W. P. ..... P 930
Cronquist, N. R. ..... P 918
Cushing, M. L. 879
Davis, D. S. 877
Day, F. T. 879, 890, 897
Day, G. A. ..... P 916, P 917
Dean, J. C. 911
Dhus, E. F. 906
Dickhaut, C. A. ..... P 926
Dixon, M. H. 904
Dobson, J. G. 905
Dodge, W. ..... P 924
Doering, H. 894
Duff, C. H. 867
Dunn, S. 870
East, W. H. 859
Eastman Kodak Company ..... P 929
Edwards, J. ..... P 923
Egan, L. W. 878
Ehemann, G. C. 912
Engler, W. N. 887
Eppelsheimer, D. S. 870
Erdtman, H. 914
Erspamer, A. S. 880
Essen, C.-G. von 860
Farmer, C. T. 884
Farrant, G. 868
Fearnside, K. 898
Feigelman, H. A. ..... P 921
Fenton, R. H. 872
Ferguson, R. R. 874
Firrell, J. P. 882
Fischer, E. K. 910
Fisher, H. C. ..... P 927
Fleischer, N. I. ..... P 928
The Fleischer Mills, Inc. ..... P 928
Fogelberg, B. C. 891
Fogman, C.-B. 862
Food and Agriculture Organization of the United Nations 864, 881
Forrer, H. W. ..... P 918
Frankenstein, W. P. ..... P 921
The Franklin Institute 874
Frederick, E., Jr. ..... P 918
Freese, F., Jr. 895
Frieder, L. P. ..... P 927
Frisch, N. M. 879
Fröhlich, E. 872
Fuller, R. G. 848
Gahl, E. A. 873
The Gardner Board and Carton Co. . P 927
Gibbs, F. S. 905
Gibbs, R. E. 871
Glick, S. E. ..... P 930
Goring, D. A. I. 854, 855
Gosnell, E. J. ..... P 928
Goumeniouk, G. I. ..... P 924
Gran, G. 858
Gray, H. Z. ..... P 819
Gray, V. R. 889
Gussman, L. 879
Gustafsson, G. R. 858
Guyer, R. ..... P 921
Hage, G. S. 904
Häggroth, S. 907
Hall, P. 882
Hall, R. W. 871
Hamlin, S. C. 875
Harrison, V. G. W. 890
Harston, C. B. 848
Harvin, R. L. 877
Hercules Powder Company ..... P 920
Hershberger, A. 896
Hewitt-Robins, Incorporated. *Robins Conveyor Division* 874
Hickernell, L. F. ..... P 928
Higgs, A. C. 851
Hill, H. S. ..... P 923
Hills, G. B., Jr. 877
Hipp, N. J. 854
Hirst, E. L. 915
Hoag, L. E. 895
Holland, O. C. 898
Holloway, D. F. ..... P 927
Holtzman, M. M. ..... P 918
Hoos, B. G. ..... P 916, P 917
Höpner, T. 857
Hornbostel, L. ..... P 923
Hougen, L. 854
Hough, L. 867
Howard, K. L. ..... P 929
Hughes, R. V. 913
Hughey, G. B. ..... P 917
Hundley, R. R. ..... P 923
Hyttinen, A. 866
Imset, O. 849
Interstate Folding Box Company ... P 922
Jackson, E. W. 896
Jaeger, J. C. 865
Jayme, G. 850, 893
Jelling, M. ..... P 931
Jensen, W. 909
Johanson, S. 909
Johanson, T. I. ..... P 930
Johansson, A. 858
Johnson, J. M. ..... P 931
Jones, D. E. ..... P 924
Jones, J. K. N. 867, 915
Jones, E. D., & Sons Company .... P 924, P 925
Jönsson, N. W. ..... P 926
Kantrowitz, M. S. ..... P 928
Karlson, K. R. ..... P 921
Katzbeck, W. J. 903
Kellogg Company ..... P 921
Kelvin, Bottomley & Baird Limited ..... P 929
Kerr, R. W. 903
Kilpper, W. 866
Kindig, H. 852
King, C. F. 897
Kishibay, C. O. ..... P 930
Klopov, V. M. 902
Koerber, C. F. ..... P 919
Kornfeld, W. F. ..... P 919
Kulev, I. G. 887
L. 897
Lahey, R. W. 901
Lamborn, B. T. ..... P 920
Lange, W. 888
Langston, Samuel M., Company ... 872
Langworthy, M. L. 871
Leitso, H. 899
Lethlean, H. V. 865
Letsch, C. H. ..... P 920
Lindgren, B. O. 870
Lindstedt, G. 914
Løschbrandt, F. 906
Lusseyran, P. 895
McEwen, R. L. ..... P 917
MacIntyre, E. 848
Mackinney, H. W. ..... P 932
Mackney, A. W. 913
Magill, D. G. ..... P 919
Maish, H. H. C. 888
Makowsky, J., Corporation ..... P 922
Mark, F. L. ..... P 931
Marshall, H. B. ..... P 932
Martin, A. W. 890
Mason, S. G. 854, 855
Melander, K. H. A. ..... P 930
Messmer, H. E., Limited 854

Minnesota and Ontario Paper Company ..... P 927
Modern Packaging 878
Mohlman, F. W. 905
Monsanto Chemical Company ..... P 931
Moore, G. A. ..... P 919
Moore, H. C. 873
Moore, J. D. 875
Moore, W. C. 875
Mørch, B. 864
Mueller, H. E. ..... P 919
Mukherjee, R. R. 868
Muntz, H. F. ..... P 921
Nadebaum, O. O. 891
Nagle, W. S. ..... P 919
National Biscuit Company ..... P 919
National Folding Box Company .... P 922
Neale, F. R. 865
Nemerow, N. L. 902
New York and Pennsylvania Co., Inc. ..... P 923
Newberg, R. G. 899
Newby, W. G., Sr. ..... P 925
Niemeyer, J. H. 889
Nolan, W. J. 877
Nordman, L. 892
Nostrip Inc. ..... P 931
Nugent, E. J. ..... P 930
Obermanns, H. E. 885
Old Dominion Box Company ..... P 923
Olive, G. W. 884
The Ontario Paper Company Limited ..... P 932
Overbagh, J. S. 860
Paine, F. A. 901
Paper and Industrial Appliances, Incorporated 900
Parker, L. T. 869
Pascoe, T. A. 913
Pearl, I. A. ..... P 932
Pearson, A. J. 865
Penn, W. S. 896
Percival, E. G. V. 915
Petrov, A. P. 885
Phipps, W. J. 883
Piazze, T. E. ..... P 928
Plummer, A. W. 908
Poor, E. N. ..... P 929
Porritt, O. W. ..... P 924
Porritts & Spencer Limited ..... P 924
Porter, R. W. 852
Powell River Company Limited .... P 924
Prebble, M. L. 867
Pulp & Paper 852, 881, 883
Putnam, C. P. ..... P 922
Quinn, D. L. 853
Quynn, R. G. 910
Rappleyea, F. A. 859
Rapson, W. H. ..... P 920
Rayon Or'ganon 898
Redfern, S. 903
Reich, J. G. 893, 911
Reid, H. A. 847, 848
Renard, J. 883
Renaud, R. 904
Reynolds Metals Company ..... P 921
Rhodes, R. C. 877
Rice, W. D. 880
Rich, J. P. ..... P 916
Richardson, S. 883
Richtzenhain, H. 870
Riley, R. 871
Roberts, A. 910
Robertson, R. J. 874
Robertson Paper Box Co., Inc. .... P 921
Robinson, B. P. 902
Robinson, K. D. 846
Robinson, E. S. & A., (Canada) Limited ..... P 929
Rothrock, C. W., Jr. 877
The Ruberoid Co. ..... P 918
Rudolfs, W. 902
Rumsey, H., Jr. ..... P 925
Russell, P. 913
S & S Corrugated Paper Machinery Co., Inc. ..... P 923
St. John, E. 880
Sams, R. H. 901
Sands, R. G. 861
The Sandy Hill Iron & Brass Works 871
Sankey, C. A. ..... P 932
Sapp, G. G. ..... P 923
Sävö, G. E. ..... P 930
Schafer, E. R. 866
Scheffer, T. C. 913
Scheye, K. G. 882
Schuller, S. 864
Schultz, S. J. ..... P 932
Schuster, G. 850
Schwabe, K. 908
Scurich, S., Jr. ..... P 930
Seiberlich, J. 870
Shaw, W. S. ..... P 924
Sheldon, F. R. ..... P 917
Shellmar Products Corporation ..... P 928
Sherman, D. 872
Sherman, M. A. 896
Shields, A. F. ..... P 923
Shipp, C. F. 875
Silman, R. S. 910
Simons, F. L. 902
Simpson, J. R. 880
Simpson, W. ..... P 929
Simril, V. L. 896
Skinner Machinery Company, Inc. . 877
Skow, N. A. 860
Sloman, A. R. 847
Smerechniak, J. J. ..... P 931
Smith, L. M. 889
Smith, V. 846
Smith, V. S. 882
Somerville, J. L. 865
Sooy, B. L. ..... P 927
Spelson, N. J. 859
Stamm, A. J. 856, 889
Standard Brands Incorporated .... P 928
Stapley, S. G. ..... P 925
Stearns, E. I. 861
Steinbrunner, J. 890
Stevens, D. R. 867
Stevens, R. D. 876
Stewart, D. L. 911
Strickland, V. B. ..... P 929
Sturken, R. C. 878
Subart, W. ..... P 925
Sulfitaktiebolaget Göta ..... P 930
Sulphite Products Corporation ..... P 932
Sundstrom, F. O. 861
Swift & Company ..... P 927
Tarkow, H. 889
Technical Association of the Pulp and Paper Industry 853, 859
Thwing-Albert Instrument Company 854
Tolvi, E. 850
Triangle Package Machinery Company 846
Trobeck, K. G. ..... P 916
Turnbull, R. F. 862
Turner, G. G. 876
Turner, H. A. 855
Tuttle, D. E. 898
Tyrseck, W. J. ..... P 921
Tyson, T. D., Jr. ..... P 920
Tyson-Caffey Corporation ..... P 920
Universal Bulb Corporation ..... P 918
Van Rosen, R. ..... P 922

Vaughan, P. J. 899
Vick, E. H. .....P 922
"Vinett" 888
Voet, A. 898
Waddell, J. C. 912
Walden, E. 910
Waldorf Paper Products Company ..P 921
Waldron, John, Corporation .....P 926
Wallenberg, M. 882
Watson, A. J. 868, 892
Wayman, M. .....P 920
Weatherburn, A. S. 856
Weinerman, B. 846
Wellershaus, A. 876
West Virginia Pulp and Paper Company .....P 917
Wieczorek, T. J. 880
Wilkes, J. F. 889
Willbrandt, F. M. .....P 925, P 926
Williams, F. R. 857
Williamson, H. 850
Williamson, M. I. .....P 922
Wills, J. H. 901
Wilson, J. W. .....P 922
Wilson, W. B. 904
Winter, J. D. 888
Woods, H. J. 868
Woodward, R. N. .....P 929
Wright, A. V. .....P 929
Young, H. H. .....P 927

BOOK REVIEW

Mosher, R. H. ed 933

LIBRARY SERVICE

The Library of The Institute of Paper Chemistry is located in the Kimberly Memorial Building. Its purpose is to serve the students and the faculty of The Institute of Paper Chemistry and the chemists and technologists of the pulp and paper industry.

To contributing members it gives the following service:

A monthly bulletin is issued, listing all new books and periodicals added to the library and containing titles and abstracts of articles published during the previous month in the field of pulp and paper chemistry and technology. The annual index carries a list of periodicals currently received.

At a reasonable cost the librarian will furnish complete reference lists on chemical and technical problems for member mills, and will procure translations, photostats, or abstracts of the articles listed. Upon request, member mills working on special problems will be kept in touch with new publications related to their work.

Reviews of new publications pertaining to the field of pulp and papermaking will be included from time to time.

During the summer months and until the start of the new school year in September, the library will be open Monday through Friday from 8:00 to 5:00. It will be closed on Saturday and Sunday.